

AGRICULTURAL PRICES AND TRADE POLICIES

Paul Dorosh, Elena Briones Alonso, Shuaib Malik, and Abdul Salam

Introduction

Pakistan has a long history of market interventions that influence agricultural market prices and trade. Beginning in the colonial period under British India, successive governments have consistently intervened in wheat markets, purchasing wheat from farmers at administratively set prices and selling wheat to flour mills or wheat flour to consumers at subsidized prices. These wheat policies were designed to promote food security at the national level by ensuring adequate supplies, and at the household level by providing the country's primary staple food to urban consumers at affordable prices. There were substantial interventions in markets for other major agricultural commodities as well, and from the 1960s until the early 1990s, the Pakistani government set official producer (procurement) prices for basmati and IRRI rice, cotton, and sugarcane.¹

Major economic policy reforms in the 1990s led to a much reduced role for government in domestic markets as domestic procurement at fixed support prices for nonwheat crops other than sugarcane essentially ceased. Nonetheless, government control of wheat imports, and import tariffs on vegetable oils remain. Fertilizer subsidies and implicit subsidies on irrigated agriculture, through provision of water at prices that do not cover the maintenance costs of the system, affect farmers' profitability and crop choice. Moreover, exchange rate policies, which resulted in a substantial indirect taxation of agriculture in the 1970s and early 1980s, continue to heavily influence prices and profitability of agricultural exports.

This chapter examines exchange rate policy (because distortions in the macroeconomy have a pervasive effect on price signals throughout the

¹ IRRI rice refers to modern rice varieties developed in the 1960s and 1970s with support from the International Rice Research Institute (IRRI).

economy), as well as commodity-specific trade and domestic price policies.² Most of the chapter considers Pakistan's competitiveness relative to international markets in general, though the chapter concludes with a comparison of the prices of Pakistan's leading agricultural products with prices of those products in India.

The chapter begins with a brief description of the analytical framework for measuring the effects of these factors, followed by a description of the evolution of Pakistan's exchange rate policies—a major determinant of agricultural price incentives. Thereafter, it discusses government interventions in domestic markets of key agricultural commodities since the 1960s, along with estimates of the effects of these policies on market prices as reflected in nominal rates of protection (NRP) (the percentage deviations in domestic prices relative to border prices). It also presents measures of effective rates of protection,³ which include the effects of input subsidies (fertilizer and irrigation water) on agricultural price incentives. The results of these analyses show that most major agricultural crops (wheat, cotton, basmati and IRRI rice, and maize) have been taxed, though the rate of implicit taxation has fallen over the past two decades. Sugarcane, milk, and vegetable oil, however, have been protected through import restrictions and tariffs. Moreover, given that import tariffs and other trade restrictions have boosted domestic prices of industrial products, the overall effect of trade and pricing policies in Pakistan has been to tax agricultural production relative to industry.

Much of this discussion focuses on wheat, given the large share of wheat in cropped area and the continuing major government interventions in wheat markets. We show that wheat imports by Pakistan's government in the 1990s helped to stabilize prices at levels below the import parity border price, thereby taxing wheat farmers and subsidizing consumers of wheat.⁴ Since 2000, however, several major shifts in domestic prices relative to import parity border prices have taken place, while large-scale domestic procurement and subsidized sales of wheat to flour mills have continued. The chapter then presents a set of options for reducing the costs of wheat price stabilization,

2 This chapter focuses on agricultural prices and trade policies rather than on market actors or the structure and governance of markets. In general, Pakistan's domestic marketing in both the agricultural and nonagricultural sectors is dominated by small enterprises that are often constrained by lack of access to sufficient credit. Governance issues also hinder growth, particularly problems with contract enforcement, corruption, and law and order (Sayeed 2010).

3 Effective rates of protection are generally equivalent to the direct rates of assistance as used in WTO negotiations (see Anderson et al. 2008).

4 The border price for imports (exports) is the price of imports (exports) in the absence of tariffs, taxes, or other price distortions.

including allowing greater private-sector participation in the import trade and reducing domestic procurement of wheat. The chapter concludes with a comparison of Pakistan's and India's agricultural price policies for wheat and other major commodities, and a discussion of the implications of potential trade liberalization.

Measuring Impacts of Government Policy Interventions in Agriculture: Analytical Framework

Government policies can affect agricultural price incentives and incomes through various channels, including macroeconomic policies that influence the exchange rate and domestic price inflation, trade policy (government imports, import quotas, tariffs, and taxes), domestic pricing policies (on both outputs and inputs), and market restrictions and direct taxes/subsidies on farmers' incomes. Macroeconomic and exchange rate policies that are not sector specific generally are not considered to be within the scope of international agricultural trade policy agreements. Moreover, for purposes of international trade agreements (in particular, the World Trade Organization), a distinction is made between policies that result in a distortion in price incentives for production and policies (such as direct taxes) that do not directly affect prices.

Various indicators can be used to measure distortions in prices and the total value of the government's support (or tax) on production or consumption of a commodity. In the case of an internationally traded commodity, when there are no binding quantitative restrictions (quotas), the measures are relatively straightforward—comparing domestic prices with border prices.⁵ In the case of nontraded commodities or commodities with binding quantitative restrictions, some calculations involving price estimates of supply and demand elasticities may be needed to determine the magnitude of the distortions. The discussion below focuses mainly on tradeable commodities with no quantitative restrictions on trade.⁶

A distortion in the output price of a tradeable good can be measured as the NRP, which is the ratio of the domestic market price to the import or export

5 In theory border prices (or medium-term average expected border prices) represent the opportunity cost of using resources for domestic production. Thus, for example, if the domestic price of a product is greater than the border price, economic resources would be saved (and could be put to better use) if the product were imported instead of being produced domestically.

6 The role of administratively set government imports in wheat price formation is discussed in the next section.

parity border price (see Annex A for details).⁷ Note that the World Bank's multicountry study on agricultural price distortions (Anderson et al. 2008; Dorosh and Salam 2008) measured distortions in terms of nominal rates of assistance.⁸

In the case where there are other distortions in the economy, such as non-agricultural quotas or tariffs or exchange rate policies that prevent full adjustments to market incentives, then a hypothetical exchange rate in the absence of distortions, E' , can be used. One approach, developed for a cross-country study of the effects of trade and exchange rate policy on agriculture in developing countries by Krueger, Schiff, and Valdès (1988), estimated equilibrium exchange rates in the absence of import tariffs and foreign exchange restrictions. However, given a lack of consensus on methodologies and uncertainties in measurement, distortions in exchange rates that are not directly linked to agriculture are not included in World Trade Organization (WTO)-related measures of agricultural policy distortions.⁹

The next section summarizes earlier estimates of the direct effects of trade and pricing policies (following the Anderson and Martin approach [2008]),¹⁰ as well as measures that include distortions in exchange rates (as in the Krueger, Schiff, and Valdès [1988] approach),¹¹ and presents new estimates of distortions for 2005 through 2013.

7 Calculations of border prices generally do not include distortions in international markets caused by policies of other countries. This chapter follows that convention.

8 The nominal rate of assistance (NRA) can be decomposed into the sum of the Nominal Rate of Output Assistance (NRAO) and the Nominal Rate of Input Assistance (NRAI). A similar measure, the Producer Subsidy Equivalent (PSE) as calculated by the OECD, is defined with the distorted prices in the denominator, so that, in general, $PSE_i = NRA_i / (1 + NRA_i)$.

9 Numerous studies have been conducted to measure the effects of government trade, exchange rate, and pricing policies on Pakistan's agriculture. The first major study, by Hamid, Nabi, and Nasim (1990), used a framework developed for a multicountry study of the effects of agricultural trade and pricing policies by Krueger, Schiff, and Valdès (1988). This approach includes a measure of the indirect effects of industrial trade policy on real exchange rates and real agricultural prices. Dorosh and Valdès (1990) extended this analysis to include an econometric estimate of real exchange rate distortions arising from industrial trade policy and a multimarket analysis of effects on supply and demand of major agricultural commodities.

10 Though exchange rate distortions were not considered as policy distortions, the Anderson and Martin methodology uses parallel exchange rate premiums but does not include measures of other exchange rate distortions.

11 Another difference in these methodologies is that the Krueger, Schiff, and Valdès methodology measures distortions by direct price comparisons of estimated border prices with domestic market (or official) prices, not just explicit price distortion due to actual tariffs, taxes, or subsidies. For most commodities, these two approaches were identical up to the early 1990s, when procurement/support prices were eliminated or no procurement took place for basmati and IRRI rice, cotton, and most other agricultural commodities. In this chapter, we use only explicit trade, tax, and pricing policies from 2000 onward in the estimates of distortions for these commodities (see Valdès 2013).

Trade and Exchange Rate Policies

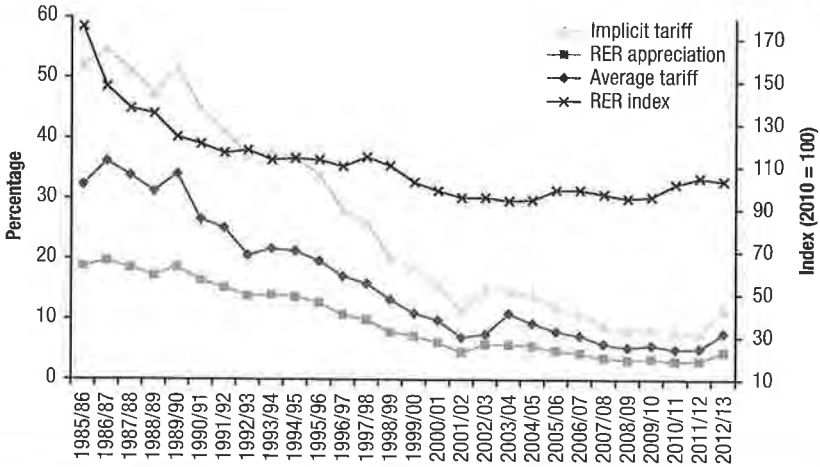
From independence until the mid-1980s, Pakistan operated a fixed nominal exchange rate regime, with few changes in the nominal exchange rate relative to the US dollar.¹² In the 1960s, various multiple exchange rate and export bonus schemes were put into place to increase incentives for exports. The official nominal exchange rate remained fixed throughout the 1960s, however, until a major devaluation in April 1972 (following the secession of East Pakistan/Bangladesh in 1971), when the Pakistani rupee (PKR) was devalued from PKR 4.76 per US\$ to PKR 11.03 per US\$. Thereafter, from 1972 to 1981, domestic inflation was approximately equal to world price inflation (in US dollar terms), and Pakistan's real exchange rate changed little, in spite of a constant nominal exchange rate from 1973 through 1981 (Dorosh and Valdès 1990).

To improve incentives for export growth, the government, led by Zia ul-Haq from 1977 to 1988, undertook a succession of nominal devaluations of the rupee (totaling 73 percent) from PKR 9.90 per US\$ to PKR 17.20 per US\$ between fiscal years 1981 and 1987. The devaluations, combined with adjustments in fiscal policy, achieved a real exchange rate depreciation of 65 percent (Figure 7.1).¹³

Pakistan's import substitution trade policy, aimed at promoting the industrial sector, was itself a major factor influencing the real exchange rate in the 1970s and 1980s. By raising the domestic price of industrial goods, import tariffs and quotas reduced demand for imports, thereby tending to reduce the demand for foreign exchange and to lead to an appreciation of the equilibrium real exchange rate (Dornbusch 1974). Using parameters estimated from a time-series regression linking monthly real exchange rates with the implicit tariff rate, the terms of trade, and other factors, Dorosh and Valdès (1990)

12 Further details on Pakistan's trade and exchange rate policies from the 1960s through the late 1980s can be found in Hamid, Nabi, and Nasim (1990) and Dorosh and Valdès (1990).

13 According to economic theory, nominal devaluations, in themselves, cannot cause real exchange rate changes. However, these nominal devaluations also directly reduced the implicit tariff on imports due to quotas, a policy shift that does affect relative prices. Moreover, since prices do not instantaneously reach their equilibrium levels (in part because of relatively sticky nominal prices for goods such as wheat procured by the government, electricity, and fuel, and for public-sector wages), nominal devaluations may have real exchange rate effects lasting several years.

FIGURE 7.1 Import tariffs and real exchange rates, Pakistan, 1986–2013

Source: Real exchange rate: IMF (2014); Dorosh and Salam (2009); authors' calculations.

Note: RER = real exchange rate. The percentages in the left-hand y-axis apply to implicit tariff, RER appreciation, and average tariff. The right-hand y-axis applies to RER index.

estimate that an implicit tariff, which averaged 48 percent from 1983 to 1987, resulted in a 17 percent appreciation of the real exchange rate.¹⁴

To some extent, adverse real exchange rate effects for industrial goods were offset by import tariffs and other import restrictions that raised the domestic price of these imports. For agricultural goods, however, these adverse real exchange rate effects largely offset any protection provided from import tariffs, and for exportable products, substantially decreased incentives for production.

Trade and Exchange Rate Policy Reforms

Beginning in the late 1980s, Pakistan adopted a managed float exchange rate policy that resulted in gradual nominal depreciation of the rupee as fiscal deficits, workers' remittances, and foreign borrowing helped to boost money supply and domestic inflation. Thus, there was relatively little change in real

¹⁴ The implicit tariff rate, which measures the combined effect of import tariffs and quotas on domestic prices, is defined as the ratio of domestic prices (measured at the border) to import prices. In the absence of detailed data on domestic and import prices, we extend the earlier series of implicit import tariff estimates by Dorosh and Valdés (1990) using the average percentage change in actual average tariff rates. Note that to the extent that domestic goods also pay sales taxes, these sales taxes do not represent a trade policy distortion if they are in lieu of a sales tax on the imported products.

exchange rates from 1987 through 2001. Even during the 1996 and 2001 periods of high domestic inflation, when the nominal exchange rate depreciated by 74 percent from PKR 33.6 per US\$ to PKR 58.4 per US\$, the real exchange rate depreciated by only 11 percent.

Trade taxes were also sharply reduced. Net customs duties fell from an average of 34 percent of total import value in 1985–1989 to 22 percent in 1990–1996, and to an average of only 12 percent and 9 percent in 1997–2000 and 2001–2003, respectively. Likewise, in a series of reforms, the number of items subject to quantitative restrictions was reduced, from 1,361 in 1988 to only 970 in 1993 (Nabi 1997). Subsequent reforms begun in 1997 led to the elimination of essentially all remaining traditional quantitative restrictions and parastatal import monopolies by 2003, with the important exceptions of a ban on the import of products not included in a positive list of 677 items, and local-content programs in the automobile industry. By 2001 average statutory tariff rates were similar for agricultural and industrial products: 21.8 and 20.2 percent, respectively (World Bank 2004, 22, 44).¹⁵

Following September 11, 2001, foreign donors greatly increased financial and military support to the Government of Pakistan. These foreign exchange inflows helped Pakistan to increase public spending while avoiding balance of payments problems. There was little change in the nominal exchange rate in US dollar terms between the end of 2000 (PKR 58.0 per US\$) and 2007 (PKR 61.2 per US\$), but since that time there has again been a steady depreciation of the nominal exchange rate that has contributed to a stable real exchange rate in spite of considerable domestic inflation. By the end of 2013, the nominal exchange rate had reached PKR 105.6 per US\$, but the real exchange rate was essentially unchanged from its 2000 level.

Thus, trade liberalization in Pakistan reduced explicit and implicit tariffs sharply over time, from an average of 53 percent in 1985–1989 to an average of only 15 percent in 2001–2003 and an estimated average of 10 percent in 2011/2012–2012/2013. As a result, the effects of trade policy distortions on the real exchange rate also fell sharply, to about 3 percent in the latter period. Nonetheless, fluctuations in nominal and real exchange rates have the potential to dramatically affect profitability of major tradeable crops for which there is little or no current trade policy intervention (cotton, basmati rice, and IRRI rice).

15 Trade reforms were partially reversed in 2006 and again after the 2008 global financial crisis, as customs and “regulatory” duties were increased. Statutory Regulatory Orders were often used to provide exemptions from tariffs for specified firms, exemptions not available to other commercial importers (Pursell, Khan, and Gulzar 2011).

Empirical Estimates of Distortions in Pakistan Agriculture

1960s to 1980s: Exchange Rate Effects Dominate Direct Agricultural Market Interventions

Pakistani government interventions in agricultural markets follow the same broad patterns of exchange rates and overall trade policy described above—major interventions in markets in the 1960s, 1970s, and 1980s, followed by liberalization in the 1990s and 2000s. There are, however, major differences across commodities, with far greater liberalization for major agricultural exportables, continued tariffs on vegetable oil and milk powder, and substantial continued interventions in the markets for wheat and sugarcane.

From the 1960s through the early 1980s, the government set procurement prices/support prices for the five major crops: wheat, basmati rice, IRRI rice, cotton, and sugarcane. Government purchases and sales of these commodities were substantial, resulting in major fiscal costs, particularly for wheat and to some extent for rice and cotton.

Although procurement prices were set above border prices (measured at official exchange rates), the substantial overvaluation of the rupee, which was related to industrial trade policy and macroeconomic policy, generally resulted in implicit taxation of these commodities (prices below border prices measured at equilibrium exchange rates) and declining real prices of these commodities over time.

In the 1960–1971 period, procurement prices for all major commodities except basmati rice were on average higher than border prices, estimated using the official exchange rate. At estimated equilibrium exchange rates (that ranged from PKR 9.1 per US\$ to PKR 11.6 per US\$, compared to the official rate of PKR 4.78 per US\$), however, procurement prices were far below border prices. The effect was especially pronounced for major exportable crops (basmati rice, ordinary rice, and cotton¹⁶), for which domestic prices were on average 54 percent below border prices at equilibrium exchange rates (Table 7.1).

After the major devaluation of the Pakistani rupee in 1972, procurement prices were closer to border prices for most of the 1970s and 1980s, but there was still substantial direct and indirect taxation of exportables, averaging –15 percent (direct effects) and –38 percent (total effects). Likewise, procurement prices of wheat were on average 31 percent below border prices at official exchange rates and 46 percent below border prices at equilibrium exchange

16 Note that during this period, there were no procurement prices for cotton.

TABLE 7.1 Nominal rates of protection for agricultural products (%), 1962–2014

Period	Basmati rice	IRRI rice	Cotton	Wheat	Sugarcane	Milk	Total
1962–1964	-51.0	-42.8	-18.8	-13.2	137.0	—	-1.0
1965–1969	-41.1	-46.0	-17.5	11.4	234.2	70.4	21.7
1970–1974	-37.3	-18.8	-6.3	-16.2	113.4	123.8	9.3
1975–1979	-46.6	-33.8	-5.1	-21.2	33.6	54.6	-11.8
1980–1984	-49.5	-24.6	3.1	-22.3	72.4	47.5	-9.3
1985–1989	-56.2	-20.2	-6.1	-21.7	123.7	54.5	-5.9
1990–1994	-17.9	-0.5	-19.9	-27.1	52.1	25.4	-10.2
1995–1999	0.4	-0.9	-7.9	-20.2	54.3	16.9	-2.6
2000–2004	0.0	0.0	7.0	-13.9	44.6	19.7	-3.9
2005–2009	0.0	0.0	0.0	—	25.8	—	2.0
2010–2014	0.0	0.0	0.0	—	33.2	—	2.6

Source: Dorosh and Salam (2009); authors' calculations.

Note: At import parity, nominal rates of protection (NRPs) for wheat in 2005–2009 and 2010–2013 would be -26.0 percent and -15.5 percent, respectively. Using these figures, the total NRP is -13.3 percent and -6.6 percent for the two periods. However, Pakistan was not an importer of wheat in most of these years. Whether numbers are positive or negative indicates whether domestic prices are above (positive) or below (negative) the border price. — = not available.

rates. Only for sugarcane (and milk) were procurement prices above border prices at both official and equilibrium exchange rates. Although fertilizer and pesticide prices were generally below border prices, these inputs accounted for too small a share of the value of production to offset the taxation on output prices, so effective rates of protection were generally negative as well. Thus, for nearly three decades, most tradeable agricultural products faced substantial price disincentives for production through both direct and indirect taxation.

Since the late 1980s, exchange rate distortions have played a far smaller role in influencing domestic prices of agricultural commodities. Instead, commodity-specific taxes and market interventions have been the dominant determinants of agricultural price distortions in Pakistan, as described below.

Wheat

Over the past several decades, government wheat policy in Pakistan has attempted to balance the competing interests of producers and consumers in an effort to achieve food security in terms of both availability and access to food. On the supply side, policy has aimed at increasing wheat productivity (yields) and output, supporting farmer incomes (though large farmers account for most of the sales to government), and reducing dependence on food imports. On the consumption side, the major policy goals have been ensuring

availability of wheat flour at affordable prices and maintaining price stability. In recent years, however, there has been increasing debate regarding the high fiscal cost of wheat subsidies and the substantial amounts of bank credit extended to government agencies for wheat procurement.¹⁷

The mechanisms for government market interventions in wheat have varied substantially over time. From the 1960s until the early 1980s, large volumes of domestically produced wheat were procured at fixed prices at procurement centers. Net injections of wheat and wheat flour—releases minus domestic procurement—averaged 12 percent of total net availability during the 1970s (Dorosh and Salam 2008). The government also maintained a monopoly on imports. Wheat flour was sold in ration shops at a subsidized price.

During the 1972–1974 period, when world prices of wheat and other grains rose sharply, Pakistan kept its prices relatively stable, effectively insulating its domestic wheat market from the world market through government imports and subsidized sales. Ration shop sales were eliminated in 1987/1988 because of huge leakages and high fiscal costs (Alderman and Garcia 1993). Thereafter, government wheat was sold to flour mills at fixed, subsidized prices. In general, there were no controls on the price of the flour sold by the mills. From 1975/1976 through 1987/1988, net imports were relatively small (averaging 802,000 tons per year—equivalent to just 7.5 percent of net availability),¹⁸ and net domestic distribution (net sales by the government) was only 436,000 tons per year—equivalent to just 4.2 percent of net availability (Table 7.2). Given relatively price-inelastic supply and demand,¹⁹ together with a government monopoly on international wheat trade, these interventions were sufficient to keep the domestic prices far below import parity prices at both the official and equilibrium exchange rates.

In the 1990s (1988/1989–1999/2000), net imports of wheat almost tripled, to 2.37 million tons per year, and net distribution rose to nearly 2.0 million tons per year, equivalent to 15.0 percent and 12.0 percent of net availability, respectively. These interventions kept domestic wheat prices (wholesale price Lahore) below import parity and stable in real terms, as international prices (import parity) trended downward in real terms from the early 1990s to 2000 (except for a price spike in 1995/1996) (Figure 7.2).

17 See Salam and Mukhtar (2008) and Dorosh and Salam (2008).

18 Net availability is calculated here using an adjustment of 10 percent for seed, feed, and losses.

19 Own-price elasticities of demand for wheat are estimated to be -0.242 for urban households and -0.360 for rural households (see Chapter 6); own-price elasticities of supply were estimated by Ali (1990) as 0.228 in the short run and 0.327 in the long run.

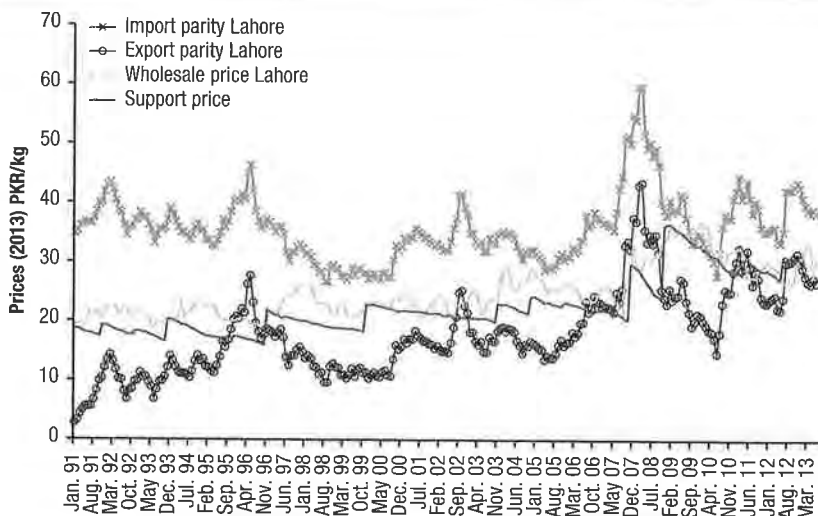
TABLE 7.2 Overview of wheat policies and the wheat market in Pakistan, 1975/1976–2012/2013

Period	Description	Production (1,000s MT)	Procurement (1,000s MT)	Distribution (1,000s MT)	Net imports (1,000s MT)	Net availability per capita (kg/capita)	Real wholesale price (2013 PKR/kg)	NRP import parity (%)
1975/1976– 1987/1988	Subsidized sales of wheat through ration shops; public imports lower market prices	10,646	2,813	3,249	802	120	19.54	–47
1988/1989– 1999/2000	Liberalized retail sales; large-scale public imports lower market prices	15,845	3,681	5,671	2,369	132	20.85	–40
2000/2001– 2006/2007	Reduced public imports and net availability; domestic prices rise; exports to Afghanistan	19,986	4,572	4,391	–376	114	24.50	–26
2007/2008– 2008/2009	Very high world prices; domestic prices rise; exports banned; large public imports	22,127	4,170	6,052	315	118	29.86	–4 ^a
2009/2010	International prices fall; domestic prices at import parity, but little trade	24,033	9,231	5,985	147	106	35.28	1
2010/2011– 2012/2013	Moderate rise in world prices; domestic prices at export parity; net exports	23,999	6,219	6,348	–1,463	116	29.86	10 ^a

Source: Authors; GoP (various years) *Pakistan Economic Survey*; GoP (various years) *Agricultural Statistics of Pakistan*.

Note: NRP = nominal rate of protection; MT = metric tons; kg = kilograms; PKR = Pakistani rupees.

^a The export parity price was used for the calculation of the NRP. The NRP measures distortions to the output price and does not take into account assistance to inputs. Border prices and domestic wholesale prices are measured at the wholesale market in Lahore.

FIGURE 7.2 Real wholesale, border, and support prices of wheat, 1991–2013

Source: Authors' calculation, based on Anderson and Nelgen (2013); GoP (various years) *Pakistan Statistical Yearbook*; IMF (2014); and FAO (2014).

Note: The support price is the set price at which the government procures wheat. Border prices and domestic prices are measured at the wholesale market in Lahore; PKR = Pakistani rupees; kg = kilograms.

The government cut back on public imports early in the 2000–2009 decade, in part because of a bumper harvest, followed by record procurement of 8.6 million tons, more than double the procurement in the previous year.²⁰ Moreover, net distribution fell to an average of –181,000 tons per year, reducing net availability per capita to an average of 114 kg per person, 14 percent below the average of 1988/1989–1999/2000. Average real wholesale prices rose to 24.5 (2013) PKR/kg, an increase of 18 percent. With rising world prices, however, the NRP fell in absolute value terms, from –40 percent to –26 percent (Table 7.3 and Table 7.4).

From 2007 to 2011, Pakistan faced a turbulent period involving international and domestic price surges, followed by massive floods in the Indus River basin. In 2006/2007, international wheat prices started to rise while domestic prices fell in response to expectations of a bountiful 2007 harvest. As a result, exports once again became profitable, and in April 2007 the government lifted an export ban on wheat (flour) that had been in place since 2003 and permitted 500,000 tons of private-sector wheat exports (Dorosh

²⁰ During this period, Pakistan's exports of wheat flour to Afghanistan surged as domestic production of wheat in Afghanistan fell and commercial wheat mills were damaged in the war (Chabot and Dorosh 2007).

TABLE 7.3 Price decomposition of nominal international and domestic wheat prices, 1975/1976–2012/2013

Period	Inter-national wheat price (US\$/MT)	Pakistan exchange rate (PKR/US\$)	C&F Karachi (US\$/MT)	C&F Karachi (PKR/kg)	Import parity (PKR/kg)	Export parity (PKR/kg)	Wholesale price wheat (PKR/kg)	Pakistan CPI 2005 = 100	US CPI 2005 = 100
1975/1976–1987/1988	146.05	12.80	168.26	2.13	3.19	0.89	1.67	20.01	46.39
1988/1989–1999/2000	149.54	32.23	183.80	5.85	7.65	3.48	4.69	50.80	76.61
2000/2001–2006/2007	152.46	59.16	188.33	11.16	13.20	8.18	9.73	91.13	97.58
2007/2008–2008/2009	296.20	68.76	346.62	23.54	26.86	18.81	17.67	134.58	110.05
2009/2010	211.05	83.25	261.05	21.71	25.12	16.74	25.32	165.44	111.66
2010/2011–2012/2013	298.07	89.81	348.07	31.36	34.73	25.42	26.92	208.18	117.34

Source: Authors; GoP (various years) *Pakistan Economic Survey*; GoP (various years) *Agricultural Statistics of Pakistan*; IMF (2014).

Note: C&F = cost and freight. Border prices and domestic prices are measured at the wholesale market in Lahore; MT = metric tons; PKR = Pakistani rupees; kg = kilograms; CPI = consumer price index.

TABLE 7.4 Price decomposition of real international and domestic wheat prices, 1975/1976–2012/2013

Period	Real inter-national wheat price (2013 US\$/MT)	Pakistan real exchange rate (2013 PKR/US\$)	Real C&F Karachi (2013 PKR/kg)	Real FOB Karachi (2013 PKR/kg)	Real import parity (2013 PKR/kg)	Real export parity (2013 PKR/kg)	Real wholesale price wheat (2013 PKR/kg)	NRP import parity	NRP export parity
1975/1976–1987/1988	380.17	58.13	24.46	24.17	37.26	10.79	19.54	-0.47	1.05
1988/1989–1999/2000	232.95	95.36	26.90	25.64	35.87	15.33	20.85	-0.40	0.42
2000/2001–2006/2007	183.38	124.65	28.15	26.80	33.34	20.57	24.50	-0.26	0.21
2007/2008–2008/2009	317.32	109.77	40.73	39.25	46.48	32.60	29.86	-0.35	-0.07
2009/2010	222.88	109.83	30.28	28.83	35.04	23.35	35.28	0.01	0.51
2010/2011–2012/2013	299.25	99.14	34.62	33.38	38.39	28.05	29.86	-0.22	0.07

Source: Authors; GoP (various years) *Agricultural Statistics of Pakistan*; IMF (2014).

Note: C&F = cost and freight; FOB = free on board; NRP = nominal rate of protection; MT = metric tons; PKR = Pakistani rupees; kg = kilograms. Border prices and wholesale prices are measured at the wholesale market in Lahore. The NRP measures distortions to the output price and does not take into account assistance to inputs.

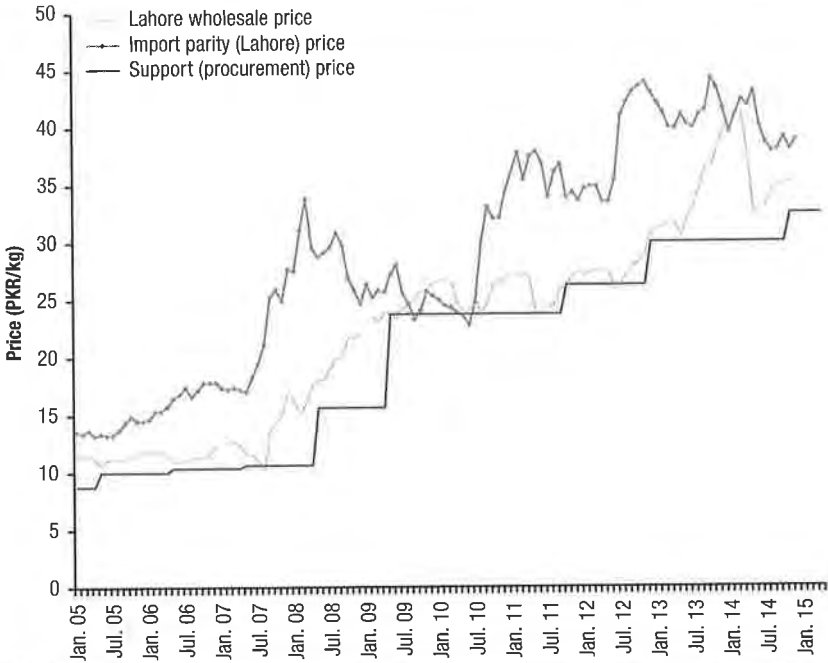
2008; Persaud 2010). Soon thereafter, however, as international wheat prices continued to rise, the government reinstated the export ban for wheat and wheat flour (except to Afghanistan) in May 2007 and started importing large quantities of wheat in an effort to stabilize domestic supply and avoid large price increases.²¹ Despite these interventions, domestic wheat prices started to rise in late 2007, increasing from 11.00 PKR/kg in July 2007 to 19.15 PKR/kg in July 2008, an increase of 74 percent. Yet as Figure 7.3 shows, this domestic price increase was not nearly as great as the surge in international prices in 2007/2008.²²

Given short supplies in international markets and high domestic wholesale prices of wheat, the government chose, in late 2008, to raise the support price for wheat by 52 percent, from 625 PKR/40kg (15,625 PKR/ton) to 950 PKR/40kg (23,750 PKR/ton). This higher procurement price helped to spur wheat production and contributed to a record harvest of 24 million tons in April–May of 2009. Despite this new record harvest, however, domestic prices increased further, peaking at 26.9 PKR/kg in February 2010 as massive government wheat procurement (9.2 million tons from the 2007/2008 crop), low public imports, and relatively modest wheat releases (5.8 million tons) resulted in a decrease in net availability to 106 kg/capita, from 118 kg/capita on average between fiscal years 2008 and 2009.

Domestic wheat prices started to decline in March 2010 and were at moderate levels when in July 2010 Pakistan was hit by severe floods. Given that the 2010 wheat crop was already harvested and stored, and the planting season for wheat (November–December) was still several months away, the floods had little impact on wheat supply (Dorosh, Malik, and Krausova 2011). In fact, the 2010/2011 harvest in April/May was slightly better than expected and was only 3 percent lower than the record harvest of the previous year. Likewise, the floods in mid-2011 once again left the following wheat harvest unaffected, and wheat production reached a new record level of 25.2 million tons, possibly attributable to nutrient-rich sediments deposited

21 In early 2008, the government extended the export ban to Afghanistan (Persaud 2010). Note, though, that Afghanistan's imports from Pakistan are small relative to Pakistan's wheat supply—only about 500,000 metric tons in 2012/2013, equivalent to about 2 percent of Pakistan's net availability of wheat of 21.4 million tons in 2011/2012. Thus, Afghanistan's wheat imports generally have only minor effects on Pakistan's domestic prices or availability of wheat. See Chabot and Dorosh (2007) and USDA (2013).

22 Nonetheless, the magnitude of the domestic price rise is puzzling given that the 2007 harvest reached a new record of over 23 million tons according to official data. Various explanations have been brought forward, including large-scale informal exports to Afghanistan (World Bank 2010), an overestimate of production (Dorosh 2008), and widespread increases in private stocks due to expectations that domestic prices would eventually increase (World Bank 2010).

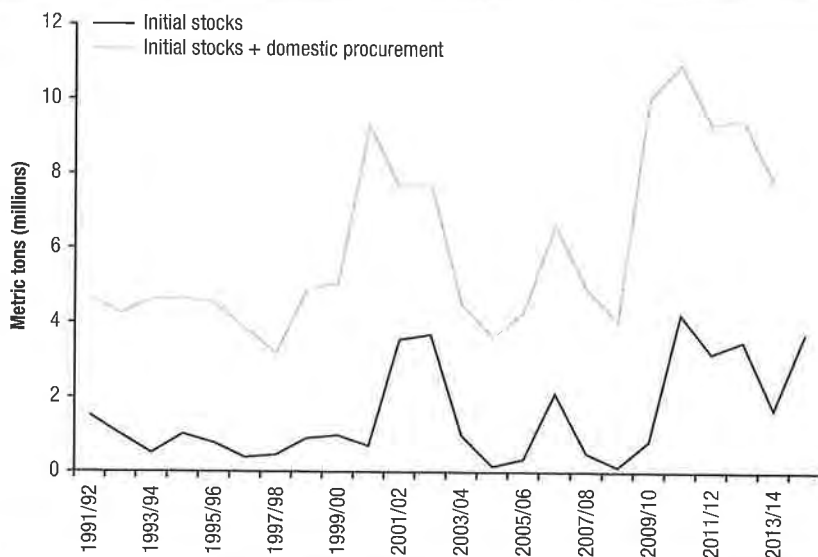
FIGURE 7.3 Wholesale, import parity, and support prices of wheat, 2005–2015

Source: Authors' calculation, based on Anderson and Nelgen (2013); GoP (various years) *Pakistan Statistical Yearbook*; IMF (2014); FAO (2014).

Notes: PKR = Pakistani rupees; kg = kilograms.

from the floodwaters, which may have contributed to increased soil fertility in some areas.

Given the record procurement in April/May 2009 and another above-normal procurement of 6.7 million tons the following year (2009/2010), Pakistan's wheat stocks reached record levels (Figure 7.4), and fiscal costs soared. In most years from 2000 to 2009, domestic procurement had ranged from 3.5 to 4.5 million tons per year. This large-scale procurement at support prices in excess of open-market prices mostly benefitted large farmers, who accounted for almost all the sales to government. Small farmers who sell wheat typically do so at (lower) open-market prices. Significant losses in provincial food departments and Pakistan Agricultural Storage and Services Corporation storage (much of the wheat is stored under tarpaulins in open areas) add to the costs of the system. Moreover, wheat procurement, storage, and distribution requires massive amounts of financing that ties up the banking system's loanable funds. Finally, sales of wheat to flour mills at a fixed

FIGURE 7.4 Initial and estimated peak wheat stocks, 1991/1992–2013/2014

Source: Author's calculations, based on GoP (various years), *Pakistan Economic Survey*.

Note: Years shown are fiscal years (July–June). Initial stocks are stocks as of May 1. Most wheat procurement takes place in May and June, a time when there is little release of stocks. Thus, initial stocks plus domestic procurement is a close approximation to peak stocks (at the end of June) for each fiscal year.

release price below open-market prices (and below full cost-recovery prices) results in enormous financial losses with no benefits to consumers, because flour mills typically sell the flour at open-market prices. In 2009/2010, estimated subsidies reached 4.28 PKR/kg (Table 7.5). If the entire 9.23 million tons of procurement had been sold at the release price, the total loss would have been PKR 39.5 billion.

Since 2009/2010 wheat procurement and subsidies have dropped somewhat, but wheat subsidies are nonetheless still substantially higher than they were in the 2005/2006–2007/2008 period (Figure 7.5): the total value of average wheat subsidies in the 2010/2011–2012/2013 period (measured in billions of 2012/2013 PKR) was 50 percent higher in real terms than in the 2005/2006–2007/2008 period (Table 7.5). This corresponds to a 46 percent increase in the quantity of procurement over this period, from 4.3 to 6.3 million tons per year. Reducing quantities of procurement to these earlier levels could save 6.7 billion PKR per year. Further gradual reductions in quantity of procurement are also possible, allowing the private sector to play a

TABLE 7.5 Estimated possible financial losses on domestic wheat procurement and sales

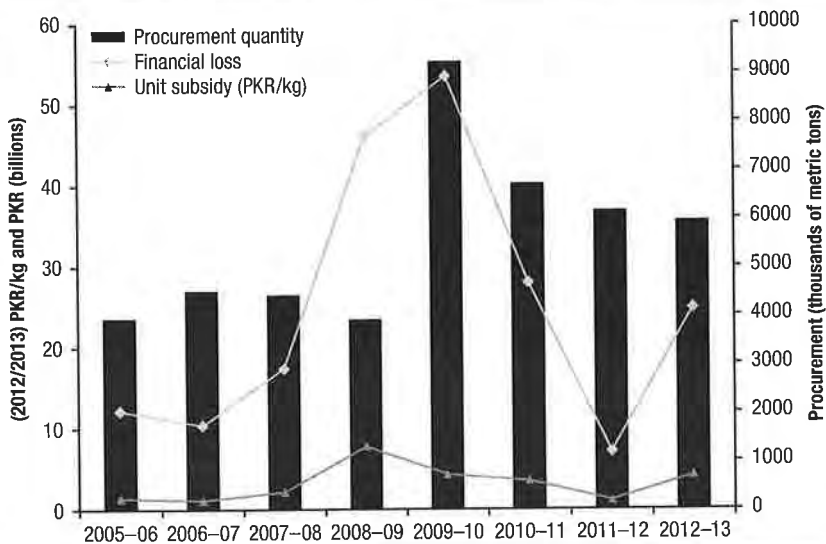
Year	Procurement quantity (1,000s MT)	Support price (PKR/kg)	Release price (PKR/kg)	Unit subsidy ^a (PKR/kg)	Financial loss ^b (B PKR)	Financial loss ^b (B 2012/13 PKR)
2005/2006	3,939	10.38	10.75	1.40	5.51	12.18
2006/2007	4,514	10.63	11.63	1.13	5.08	10.41
2007/2008	4,422	15.63	15.63	2.15	9.51	17.40
2008/2009	3,917	23.75	18.75	7.76	30.41	46.07
2009/2010	9,231	23.75	24.38	4.28	39.46	53.53
2010/2011	6,715	23.75	26.25	3.50	23.50	28.01
2011/2012	6,150	26.25	33.25	1.08	6.61	7.10
2012/2013	5,948	30.00	33.25	4.18	24.84	24.84
Avg 2006–2008	4,292	12.21	12.67	1.56	6.70	13.33
Avg 2011–2013	6,271	26.67	30.92	2.92	18.32	19.98

Source: Authors; GoP (various years) *Pakistan Economic Survey*.

Note: MT = metric tons; PKR = Pakistani rupees; kg = kilograms; B = billion.

^a Possible per kg financial loss (unit subsidy) for each year is calculated as the domestic procurement price plus the cost of incidentals minus the release price.

^b Possible financial loss is unit subsidy times quantity of procurement.

FIGURE 7.5 Wheat procurement quantities, subsidies, and financial loss, 2005/2006–2012/2013


Source: Author's calculations, based on GoP (various years), *Pakistan Economic Survey*.

Note: Unit subsidy for each year is calculated as the domestic procurement price plus the cost of incidentals minus the release price. Financial loss is the unit subsidy times the quantity of procurement. The left-hand axis measures both the financial loss in PKR (billions) and the unit subsidy in PKR/kg. PKR = Pakistani rupees; kg = kilograms.

larger role in marketing.²³ Reforms of the wheat procurement and distribution system could, therefore, bring about major fiscal benefits (Box 7.1).

Cotton²⁴

Various combinations of export taxes, export restrictions, and domestic procurement have been used to achieve the multiple objectives of cotton policy: support farmers, provide raw materials to the domestic textile industry, and promote exports of both cotton lint and textiles. Direct purchases of cotton have been minimal since 1995, however.

From 1975 to 1995, the government maintained support prices for cotton lint and seed cotton (*phutti*), and procured cotton lint from ginneries. Domestic prices of lint were also affected by the level of exports by the Cotton Export Corporation, which held a monopoly on lint exports from 1974 through 1986. Cotton producers benefitted, however, from import taxes on vegetable oils that boosted the prices of cottonseed and cottonseed oil.

From 1986 through 1993, export taxes on lint cotton were calculated as a fixed percentage of the margin between a benchmark price of lint at the cotton gin (including export costs) and a minimum export price fixed daily by an interagency committee. This system of variable export taxes effectively insulated the domestic market from movements in international prices, but it resulted in significant losses of income for cotton farmers. Collection of export taxes was plagued by underinvoicing of cotton exports through understatement of the quality (grade) of the cotton exports, and the export duty was abolished in 1994.

Since 1994 demand for lint in the textile sector has generally exceeded domestic supply, and Pakistan has become a net importer of cotton lint. Gross imports averaged 259,000 tons per year from 2000 through 2004 when the Multi-Fibre Agreement, which provided special access to markets in developed countries, ended. By 2013 Pakistan was importing about one-third of its cotton requirements (generally higher-quality cotton, in the form of lint). Duties on both exports and imports of cotton were greatly reduced in the mid-1990s,

23 In spite of government procurement, the private sector dominates much of the wheat marketing chain. Village traders (*beoparis*) typically purchase wheat directly from farmers at the farm gate. Commission agents (*aarthis*) contract *beoparis* to assemble large quantities of wheat that the *beoparis* sell on the wholesale market to flour millers and stockists. See World Bank (2014b). An earlier detailed description of wheat marketing in Pakistan is found in Cornelisse and Naqvi (1987).

24 The following sections on policies for individual crops (from "Cotton" to "Other Crops: Maize and Oilseeds") are based on Dorosh and Salam (2009).

BOX 7.1 Possible Wheat Sector Reforms

Policy reforms could promote a more-efficient wheat market and reduce the government's fiscal burden from wheat procurement. Below are eight areas for possible reforms: international trade, security stocks, domestic procurement, domestic sales, policy transparency, capacity for policy analysis, safety nets, and use of futures markets.

1. Use international trade and limited national security stocks to promote price stability.
 - a. Liberalize food imports by the private sector and announce a government policy of promoting private-sector trade. With this reform, the international market will provide a price ceiling for Pakistan, equal to the import parity price, except in exceptional cases.
 - b. Promote exports in years of abundant domestic supplies and moderate international prices.
 - c. In exceptional years of high world prices, restrictions on exports and either subsidized open market sales or transfers of government wheat imports may be required to prevent excessive price increases in Pakistan's domestic markets.
2. Maintain a limited security stock of 1.5 to 2.0 million tons (at the end of April) to be used in two ways:
 - a. To reduce domestic prices in years of low domestic production and high international prices (case 1c above).
 - b. To provide resources for emergency wheat distribution targeted to food-insecure households. Gradually reduce or eliminate domestic procurement of wheat.
3. Limit domestic procurement to a preannounced target quantity of 1–2 million tons per year (for purposes of stock rotation) to be procured at domestic market prices through open tenders or at a preannounced support price that is consistent with about 1–2 million tons of procurement.
4. Eliminate the subsidy on sales of wheat to flour mills by selling wheat (for purposes of stock rotation) through auctions.
5. Establish a wheat policy platform to facilitate information sharing and policy dialogue regarding market conditions and proposed policy changes.
 - a. This will enhance transparency of government actions and promote more-efficient markets.
 - b. The platform would include representatives of government, private-sector millers and traders, farmers' organizations, and consumers.

(continued)

BOX 7.1 Possible Wheat Sector Reforms (continued)

6. Strengthen analytical units within the Ministry of Agriculture or other institutions to enable timely and rigorous analysis of wheat markets and policy options.
7. Strengthen conditional cash transfers and employment safety nets targeted to the poor.
8. Use futures markets that in the medium term could contribute to increased wheat market efficiency.
 - a. Use of international futures markets by government agencies could lessen some of the risks involved in reliance on international markets in years of large price increases. This would reduce any subsidy on sales of public-sector imports in the event of a domestic production shortfall and high international prices (see Faruqee and Coleman 1996).
 - b. Similarly, in the medium term, if the Pakistan commodity exchange develops, large farmers, private traders, millers, and the government could hedge against price risk through futures market contracts.

and domestic procurement and other direct-market interventions have likewise been minimal.²⁵

Annual price movements suggest that domestic prices of seed cotton since the mid-1990s have essentially been determined by world prices of cotton lint and the domestic price of cottonseed (Cororaton and Orden 2008).²⁶ Thus, in the absence of external trade restrictions, the small volumes of domestic procurement in some recent years are unlikely to have had a major effect on domestic prices (and instead simply resulted in a minor decrease in the level of net imports).

Since the mid-1990s, price distortions for cotton have been minimal. After major exchange rate distortions were eliminated in the mid-1980s, export taxes on lint, designed in part to lower lint prices for the domestic textile industry, were the major source of the 20 percent average price distortion from 1990 through 1994 (the taxes were much smaller after 1994). There have

25 The Trading Corporation of Pakistan has intervened in years of bumper harvests and low domestic prices, procuring 35,000 tons (2 percent of production) in 2001 and 270,000 tons (11 percent of production) in 2004 in an effort to support prices.

26 Seed cotton consists of the cottonseed as well as the lint. Cottonseed is separated from the lint through the process of ginning.

been essentially no trade policy distortions for lint after 2005, when Pakistan became a net importer of cotton lint. Import tariffs on vegetable oils that help increase the price of cottonseed oil still provided a small measure of protection for seed cotton, however (about 3 percent in the early years of the 2000–2009 decade and 2 percent in 2013).²⁷

Basmati and Ordinary (IRRI) Rice

Pakistan has exported substantial quantities of basmati rice since the mid-1970s in response to a surge in rice demand in the Middle East following the large increase in world oil prices of the early 1970s. Initially, under the Bhutto government, these exports were managed by the Rice Export Corporation of Pakistan, a state monopoly.²⁸ Under the assumption that domestic supply was price inelastic (so that low producer prices would have little effect on quantities produced), the government set a low procurement price. To keep domestic consumption low (and export volumes high), the government also instituted a Monopoly Procurement Scheme for basmati rice, with only limited domestic sales. NRP estimates for basmati paddy suggest that during both the 1960s and 1970s, farmers received only about 50 percent of what they would have received if the government had not intervened.

Following the coup by General Zia in July 1977, rice mills were returned to the private sector, and basmati rice marketing was gradually liberalized. From 1977 to 1987, provincial food departments still retained considerable influence in domestic markets through the annual Monopoly Procurement Scheme for basmati rice. That scheme set licensing rules, restrictions on movement of rice across district boundaries, and quotas to dealers for sales in domestic markets. These dealers were allowed to sell 20 percent of the amount delivered to procurement centers in domestic markets; the remainder was exported. As a result of these restrictions on domestic supply, consumer prices were substantially above procurement prices. Compulsory procurement was abandoned in

27 Import duties on refined palm oil in 2013 were PKR 10,040/ton (average of duties on oil from Indonesia and Malaysia, excluding a customs excise duty of 16 percent). Assuming a cost, insurance, and freight price of US\$912/ton (the cost, insurance, and freight price of crude palm oil in Europe, December 2013), the import tariff was equivalent to 11.4 percent (FAO 2014). Given that cottonseed accounted for about 30 percent of the value of seed cotton at the gin and cottonseed oil accounts for about 60 percent of the value of cottonseed (2012/2013; seed cotton is two-thirds cottonseed by weight), the import duties raised the price of seed cotton by about $.114 \times .30 \times .60 = 2$ percent in 2013.

28 The Bhutto government also nationalized rice milling and other domestic industries. See Hamid, Nabi, and Nasim (1990) for an account of the history of the rice sector in Pakistan from the 1960s through the mid-1980s.

the 1986 harvest season, limited private sector exports were allowed, and voluntary procurement at increased prices was introduced.

The system of voluntary sales of basmati paddy at the announced support price continued through 2009/2010 (there were no support prices for milled basmati rice after 1996/1997 except in 2008/2009), but there have been no government purchases of basmati paddy or milled rice after 1995/1996 and no direct involvement of the government in domestic or export marketing of basmati rice since that time.

Like the policies for basmati rice, government price and trade policies for ordinary (IRRI) rice also included announced support prices and voluntary domestic procurement, although in the 1970s and 1980s the Rice Export Corporation of Pakistan did not procure much IRRI rice in Punjab because the higher transport costs (relative to Sindh, the center of procurement) made exports of ordinary rice produced in Punjab unprofitable.²⁹ NRP for IRRI rice, calculated on the basis of world rice prices, were about -20 percent, but approached zero rapidly thereafter.

Procurement prices for IRRI paddy and rice were announced in the same period as for basmati rice (that is, most years through 2009/2010), and like with basmati rice, no procurement has taken place since 1995/1996. Price distortions, therefore, are minimal, apart from subsidies to fertilizer and irrigation.

Sugarcane

Pakistan's sugarcane production fluctuates greatly from year to year because of variations in water availability, as well as producer price incentives. To stabilize prices, the Pakistani government has frequently adjusted import tariffs for sugar and related taxes on sugar, and in years of high world prices, even banned exports.

In addition to restrictions and taxes on trade, regulations on the domestic marketing and processing of sugarcane were prevalent until the mid-1980s. Zoning of sugar mills, which required farmers to sell 80 percent of their sugarcane to the mill located in their zone, was abolished in 1987, freeing farmers to sell their sugarcane to whichever mill they preferred. However, the high cost of transporting sugarcane and rapid reductions in the yield of sugar derived from cane (*the rendement*) after the cane is harvested limits the distance that cane can be profitably transported.

²⁹ Open-market prices in Punjab during this period were generally above support prices, so little voluntary procurement of paddy or rice took place.

Until 2000 the federal government annually announced the support price of sugarcane, but since then support prices have been decided by provincial governments.³⁰ Note, however, that there has been no institutional arrangement for public-sector procurement of sugarcane when sugar mills do not pay farmers the full support price, particularly in good harvest years, though sugarcane commissioners of provincial governments put pressure on mills to try to get them to pay farmers the full support price.

Given the wide variations in domestic production that affect domestic prices, as well as large fluctuations in world prices, NRP for sugar in Pakistan are very unstable. In general, though, sugarcane and refined sugar production have been highly protected. NRP averaged over 100 percent in the 1960s and early 1970s, and reached those levels again in the second half of the 1980s when international prices fell again. Even since then, they have continued to be above 50 percent.

These calculations of trade protection are highly sensitive to assumptions used for international shipping costs, milling rates, and costs of processing. Government estimates of border prices typically use high shipping costs for sugar (US\$60/ton in 2013/2014), low milling ratios (sugar per ton of sugarcane), and high costs of processing. Assumptions of high world prices raise the import parity price of sugar, and assumptions of low milling ratios and high milling costs for conversion of cane to sugar increase the import parity price of sugarcane even further. The result is that instead of finding that domestic prices are significantly above import parity (and that sugar farmers are protected), alternative calculations show that domestic prices are significantly below import parity (that is, that sugar farmers are facing substantial taxation).

Other Crops: Maize and Oilseeds

Apart from import duties, which have ranged from 10 percent to 25 percent since the mid-1990s, the government has not intervened in maize production and marketing. Nonetheless, production nearly tripled between 2000/2001 and 2013/2014, from 1.64 million tons to 4.53 million tons. Maize has generally been a nontradeable good since the 1980s, with domestic prices below import parity levels (even without the import tariffs), but above export parity levels. Thus, the protection from import competition provided by tariffs has had little effect on domestic prices, and the maize NRP has been close to zero.

30 Support prices have varied only slightly across provinces in all years except 2005/2006, when the support price in Sindh was set at 60 PKR/40 kg, 15 PKR/40 kg above the Punjab support price.

Domestic production accounts for less than one-third of edible oil use in Pakistan, and growth in domestic demand has far outpaced growth in production. In terms of quantity, edible oil imports doubled, from 1.1 million tons in 2000 to 2.2 million tons in 2012/2013. In terms of value, imports of edible oils increased more than sixfold, from US\$326 million to US\$2.03 billion. Traditional sources of domestic edible oil production have been cottonseed, a by-product of cotton farming, and rapeseed and mustard seed, but sunflower seed production has increased rapidly since early in the 2000–2009 decade.³¹

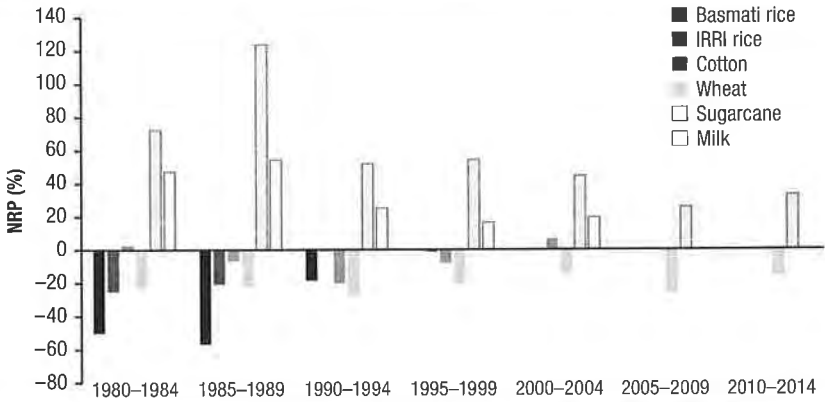
Various forms of palm oil (olein, refined bleached deodorized palm oil, and crude palm oil) accounted for about 90 percent of vegetable oil imports by weight from 2000/2001 to 2010/2011. There was little direct taxation of imported vegetable oils in the 1970s and 1980s, and exchange rate distortions led to an implicit subsidy on imports (and taxation of domestic producers) of just 3 percent in the 1970s and zero in the 1980s. Since the early 1990s, however, vegetable oils have been consistently taxed in Pakistan. For example, from 2000 through 2005, import tariffs were equivalent to about 40 percent of the import value, but they fell to only about 10 percent of the import value by 2013.

Milk

Pakistan has consistently placed tariffs on imported milk powder to protect the domestic dairy industry. NRP because of these tariffs averaged more than 70 percent in the 1960s and 1970s.³² Tariff rates for milk powder were lowered in the early 1990s and have ranged from 20 percent to 45 percent since the mid-1990s, resulting in an NRP averaging 40 percent in the 1990s, and 20 percent from 2000 through 2005. The contrast between this high level of assistance to the dairy industry, along with that for sugar, and the much lower and usually negative NRPs for the other covered products, can be seen in Figure 7.6.

31 Other oilseed crops grown in Pakistan include canola (an improved cultivar of rapeseed), soybean, groundnut, safflower, sesame, and linseed.

32 These calculations are based on the unit import value of dry skim milk, adjusted by a conversion ratio of 1:8 and a quality factor of 90 percent, following Dorosh and Valdès (1990).

FIGURE 7.6 Nominal rates of protection for agricultural products, 1980–2013

Source: Dorosh and Salam (2009); authors' calculations.

Note: Milk NRP for 2005–2009 and 2010–2014 is not available. NRP = nominal rate of protection.

Distortions to Input Prices

The major distortion to input prices in agriculture in Pakistan has been the subsidy on nitrogenous fertilizer.³³ Domestic producer prices of mainly urea have been kept consistently below import parity border prices. This has been achieved by using domestic natural gas inputs in domestic fertilizer production and passing some of the savings to farmers through a discounted price of natural gas. Since the early 1990s, there has been little or no subsidy on di-ammonium phosphate (DAP) and other major fertilizers, which are mainly imported but not produced domestically (Rashid et al. 2013).

Domestic prices of both urea and DAP averaged from 30 to 45 percent below import parity in the later 1970s and the 1980s. From 1990 to 2005, however, domestic prices of DAP on average were only 4 percent below import parity prices, while prices of urea were 38 percent below border prices. Given that the costs of DAP and urea were 10 percent and 8 percent, respectively, of the value of wheat production (Agricultural Prices Commission estimates for 2002), the implicit subsidy on fertilizer was equivalent to about 3 percent ($0.08 \times 0.38 + 0.10 \times 0.04$) of the value of wheat production from

33 Surface irrigation water is also implicitly subsidized, as water charges (*abiana*) are insufficient to cover the cost of maintenance of dams, canals, and other water channels. Measurement of the economic value of these subsidies involves assessment of overall investment and maintenance costs, as well as problems attributing these costs to various crops, so is not attempted in this study.

1990 to 2005. Likewise, for 2007/2008 through 2011/2012, domestic prices of urea were on average 40 percent below import parity prices at the wholesale (Karachi) level, and the estimated implicit subsidy on urea was about 2 to 3 percent of the value of wheat production.³⁴

Thus, the NRPs for wheat should be inflated by about 3 percentage points for most years since 1990. For the late 1970s and the 1980s, when DAP was subsidized as well, the NRPs for wheat should be about 7 percentage points (0.18×0.40) higher. NRPs for paddy, cotton, and sugarcane are also understated by similar amounts in these periods. These calculations are rather imprecise and do not include water subsidies, but they are nonetheless added to the NRP time series for the various crops for completeness and because they are nontrivial.

Implications of Trade Liberalization between Pakistan and India

The above calculations and discussion have focused on comparing international market prices with domestic prices in Pakistan because the international market prices represent the opportunity cost in terms of alternative sources of supply or demand for Pakistan's products. The huge markets in neighboring India were not considered because historically trade between the two countries has been severely limited through various tariffs, trade bans, or other restrictions, even though both countries joined the WTO when it was formed in 1995. Trade has been increasing since 2000, however, and negotiations that began in 2011 may lead to a major trade liberalization that could dramatically increase the level of trade and affect price formation in both countries.³⁵

According to the first article of the General Agreement on Trade and Tariffs, all parties to the agreement agree to trade with one another according to the most-favored-nation (MFN) principle that guarantees that each

34 This calculation uses Agricultural Policy Institute's 2010/11 estimates of 6 percent and 11 percent, respectively, for the costs of urea and DAP as shares of the value of wheat production.

35 India maintained substantial trade and pricing controls on agriculture and much of the rest of the economy from independence until July 1991, when the Indian rupee was sharply devalued, a major trade policy reform was introduced, and domestic manufacturing was substantially deregulated. Further reductions in industrial tariffs took place from 1998 to 2001, and again in 2003 and 2007. Tariffs and other trade restrictions (so-called para-tariffs) on agriculture and processed food have remained high, however (averaging over 40 percent in 2006). See Gulati and Pursell (2009).

country will give equal treatment to all other member countries in terms of tariff rates and other trade restrictions (after the establishment of the World Trade Organization, this principle applied to every member of the WTO). Exceptions are permitted, however, for preferential trade agreements and free trade agreements. Member countries are also permitted to discriminate against one another for various political reasons.³⁶

India granted MFN to Pakistan soon after joining the WTO, but it retained many nontariff barriers and other trade restrictions. Pakistan did not grant India MFN trading status until January 2013, in part because of India's continuing nontariff barriers inhibiting imports from Pakistan. Initial steps toward liberalization of trade began in 2012, however, as Pakistan reduced trade restrictions by changing from a "positive list" of 1,938 items allowed to be imported from India to a "negative list" of 1,209 items not allowed to be imported from India (bin Najib, Baig, and Ansari 2012). Initial analysis of this reform suggests that there would be little change in domestic output in Pakistan and moderate gains in consumer welfare because of lower consumer prices from this liberalization (Gopalan 2013).³⁷

Prospects for trade in major agricultural products may not be very good in the short run because of the political sensitivities in both Pakistan and India about having a significant share of supply come from each neighbor. Nonetheless, negotiating a broad trade agreement could facilitate large-scale trade in the event of a major supply shortfall in one of the countries, similar to the surge in private-sector rice trade flows from India to Bangladesh following a major flood in Bangladesh in 1998 (Dorosh 2001). Currently, however, the price differentials for wheat and sugar are not large, though India's price of rice remains significantly below that of Pakistan (Table 7.6), so neither country has a strong need to import these products from the other.

Note, however, that these price differentials do not reflect the degree of support to agriculture, because they do not take into account the effects of input subsidies, which have generally been substantial in India. As Figure 7.7 shows, NRP to agriculture (a measure that here includes price distortions to

36 Article XX and Article XXI of the 1968 General Agreement on Tariffs and Trade provide for general exceptions to the MFN principle. A special exception was included for Pakistan and India in paragraph 11 of Article XXIV, as well. See the discussion in Memon, Rehman, and Rabbi (2014).

37 Using an imperfect substitution trade model with standard parameters, and assuming an implicit tariff of 200 percent for previously banned items, simulations in Gopalan (2013) indicate that the largest declines in domestic production would occur in the tobacco, pharmaceuticals, and cloth sectors, but that the largest percentage declines would be in leather, sporting goods, and footwear.

TABLE 7.6 Wheat, rice, and sugar prices in India and Pakistan, 1990–2013

	1990–1999	2000–2009	2010–2013
Wheat			
Pakistan ^a (US\$/MT)	145.9	190.2	293.2
India ^b (US\$/MT)	106.6	186.3	267.0
World price ^c (US\$/MT)	148.8	184.2	291.3
Pakistan/India ratio	1.38	1.02	1.10
Pakistan/world ratio	1.01	1.06	1.03
Ordinary rice			
Pakistan ^d (US\$/MT)	397.4	357.9	488.9
India ^e (US\$/MT)	175.1	238.2	327.0
World price ^f (US\$/MT)	285.1	312.5	525.2
Pakistan/India ratio	2.29	1.57	1.51
Pakistan/world price ratio	1.41	1.34	0.93
Sugar			
Pakistan ^g (US\$/MT)	538.2	474.1	652.9
India ^h (US\$/MT)	298.4	357.3	613.7
World Price ⁱ (US\$/MT)	250.2	228.4	476.4
Pakistan/India ratio	1.82	1.38	1.06
Pakistan/world price ratio	2.28	2.24	1.37

Sources:

^a Wholesale wheat price Lahore: 1962–2004 World Bank (2005); 2005–2013 GoP (various years), *Pakistan Statistical Yearbook*.

^b Wholesale wheat price Delhi: 1964–2001 World Bank (2005); 2002–2014 National Information Center (Gol 2014).

^c World wheat price, US hard red winter: 1961–2013 World Bank Pink Sheet (World Bank 2014a).

^d Wholesale rice price Lahore: 1962–2004 World Bank, IRRI (World Bank 2005); 2005–2013 GoP (various years), *Pakistan Statistical Yearbook*.

^e Wholesale rice price Delhi: 1964–2000 World Bank (World Bank 2005); 2001–2014 National Information Center (Gol 2014).

^f World rice price, Thai 5%: 1961–2013 World Bank Pink Sheet (World Bank 2014a).

^g World sugar price Lahore: 1961–2004 World Bank (World Bank 2005); 2005–2013 GoP (various years), *Pakistan Statistical Yearbook*.

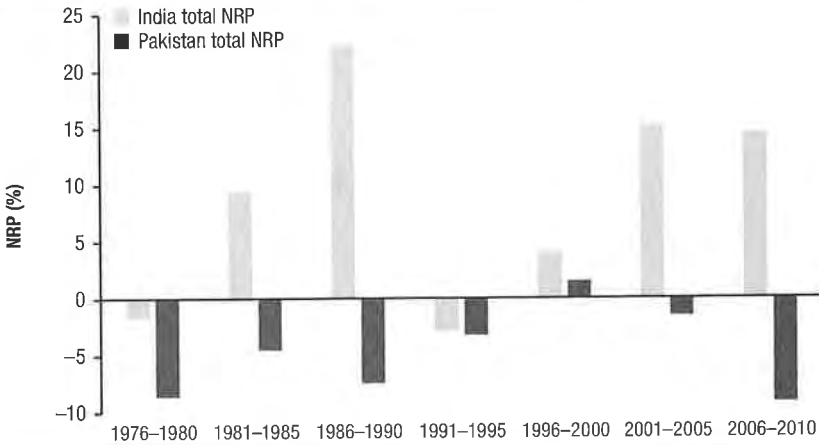
^h World sugar price Delhi: 1965–2002 World Bank (World Bank 2005); 2003–2014 National Information Center (Gol 2014).

ⁱ World sugar price: 1962–2014 World Bank Pink sheet (World Bank 2014a).

Note: MT = metric tons.

outputs as well as inputs) have generally been more positive in India than in Pakistan. For the 2006–2010 period, India's NRP averaged 15 percent, compared to –2 percent for Pakistan.

Ultimately, though, private-market trade flows depend on output price differentials, not on the extent of subsidies. Wholesale wheat prices in Pakistan (Lahore) were on average 38 percent higher than wholesale wheat prices in India (Delhi) in the 1990s, but close to international market prices

FIGURE 7.7 Nominal rates of protection to agriculture in Pakistan and India, 1976–2010

Source: Authors' calculation based on Anderson and Nelgen (2013).

Note: NRP = nominal rate of protection.

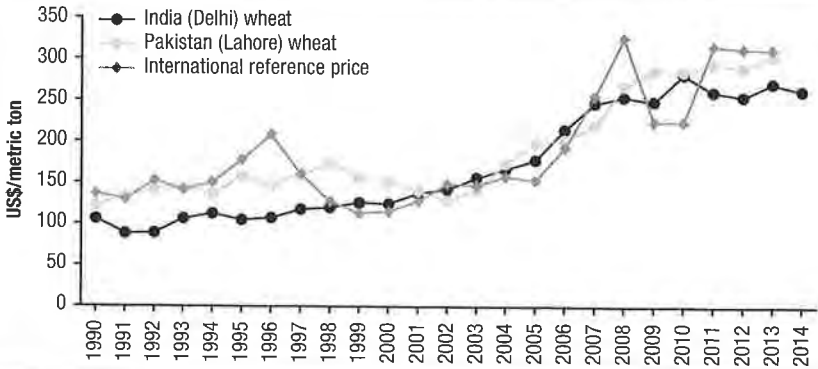
(Figure 7.8).³⁸ This suggests that in this period, if wheat trade had been liberalized, there could have been substantial flows of wheat from India to Pakistan. From 2000 onward, though, the wheat price differentials between Pakistan and India have been small, suggesting little opportunity to trade ordinary wheat, even if restrictions were removed.

Pakistan's prices for rice have been consistently above those of India, though the differential narrowed considerably from 2005 through 2007 (Figure 7.9). Pakistan's price of ordinary (IRRI-6) rice was more than double that of Indian rice in 1990–1999 and averaged about 50 percent higher than Indian rice from 2000 through 2013. However, Pakistan's rice price has been relatively close to the price of rice in international markets since 2000.

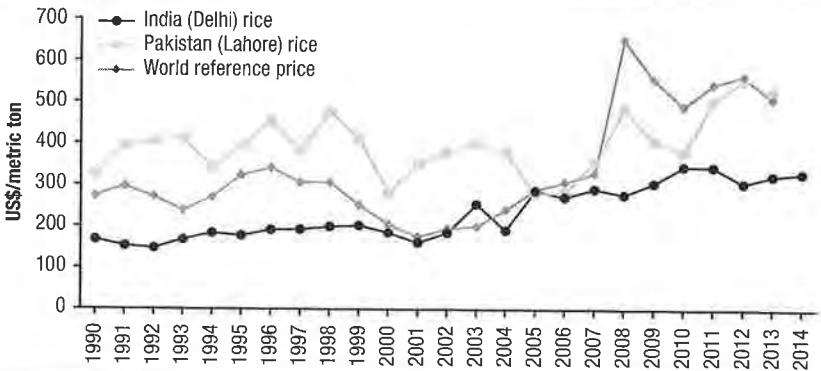
Similar to wheat prices, sugar prices in Pakistan were substantially higher than those in India in the 1990s, but the differential has narrowed considerably, so from 2010 to 2013, average Pakistani prices were only 6 percent above those in India.³⁹ Prices of sugar in both countries have been consistently much

³⁸ Note that, unlike the calculations of nominal rates of protection for agriculture for India and Pakistan, no adjustment is made here for transportation or other marketing costs. During this period, the estimated nominal rate of protection in Pakistan was -23 percent.

³⁹ These calculations do not take into account possible quality differences between sugar in India and Pakistan.

FIGURE 7.8 Wheat prices in India, Pakistan, and the world, 1990–2014

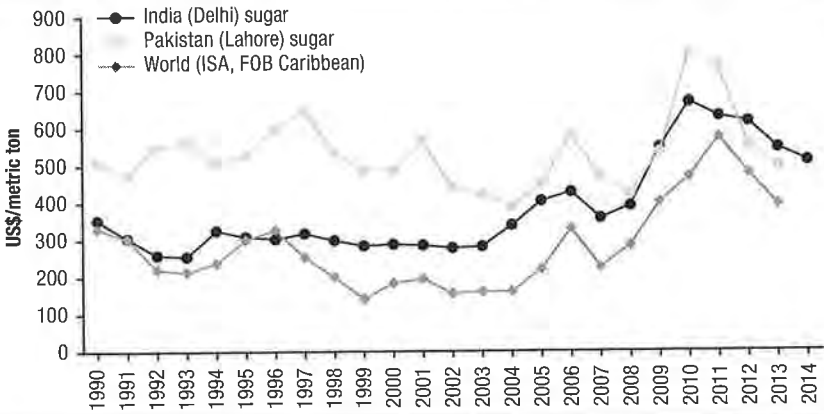
Source: Gol (2014); GoP (various years), *Pakistan Statistical Yearbook*; World Bank (2005); World Bank (2014a).

FIGURE 7.9 Rice prices in India, Pakistan, and the world, 1990–2014

Source: Gol (2014); GoP (various years), *Pakistan Statistical Yearbook*; World Bank (2005); World Bank (2014a).

higher than international prices, as domestic producers in both countries have been subsidized, at a cost to consumers (Figure 7.10).

Trade in other agricultural commodities may be profitable, even if trade in these three major commodities is not. A large volume of pistachios is being exported from Pakistan to India (much of the pistachios originating in Afghanistan), and substantial volumes of fruits and vegetables may be flowing in both directions. Streamlining customs procedures (including sanitary and phytosanitary regulations and inspections) will be important if this trade is to flourish.

FIGURE 7.10 Sugar prices in India, Pakistan, and the world, 1990–2014

Source: Gol (2014); GoP (various years), *Pakistan Statistical Yearbook*; World Bank (2005); World Bank (2014a).

Note: FOB = free on board.

Summary and Policy Implications

Pakistan's agricultural markets and trade policies have undergone significant changes over the past several decades. State interventions, which dominated agricultural policy in the 1970s and most of the 1980s, were greatly reduced in the late 1980s and the 1990s, and implicit taxation of agriculture through exchange rate distortions, administered agricultural prices, and trade policy have been eliminated for most crops, including cotton, basmati rice, and ordinary (IRRI) rice. The dairy, vegetable oil, and sugarcane sectors still enjoy substantial trade protection through import tariffs and other restrictions, however, and government purchases and sales of wheat entail huge fiscal costs. And subsidies on fertilizer, canal water (irrigation fees less than the maintenance costs of canals), electricity, and fuel for pumps remain a persistent feature of government policy, but they are small, accounting for about 5 percent or less of the value of production.

Reforms in the wheat sector (such as sizable reductions in domestic procurement and elimination of subsidies on wheat supplied to mills) could bring huge benefits in terms of fiscal savings, more efficient wheat markets, more resources for agricultural research or targeted safety nets, and ultimately greater food security for the poor. Liberalization of the wheat market, however, need not mean a total abandonment of Pakistan's wheat producers and consumers to international and domestic market forces. The government would continue to have a role in price stabilization through trade policy

interventions (export restrictions or subsidized sales of public imports) to prevent large spikes in world prices from adversely affecting consumers. Moreover, accompanying policies and programs in agricultural research and extension, investments in rural roads and markets, and public-private partnerships in agricultural processing and marketing could enhance economically efficient domestic production and improve farmers' incomes. However, reforms in the wheat sector (and the sugar sector) would need to overcome the resistance of large farmers and mill owners, who capture most of the benefits of subsidies on procurement and government sales.

There are no longer significant real exchange rate distortions such as the ones caused by import tariffs or government interventions in foreign exchange markets to hold fixed the nominal exchange rates, which caused massive indirect taxation of agriculture in the 1960s, 1970s, and much of the 1980s. Nonetheless, a future real appreciation of the Pakistani rupee related to large inflows of foreign capital could seriously harm agricultural growth and incomes. A more likely scenario, though, may be shortages of foreign exchange that could lead the government to place restrictions on imports and prevent a nominal exchange rate depreciation, even in a situation of high domestic inflation, thereby leading to a real exchange rate appreciation and lower real producer incomes.

Perhaps the biggest impacts of trade policy measures on agricultural growth could be from a trade liberalization in agricultural products with India. Expanded trade need not involve only the major agricultural products, however, but could involve fruits, vegetables, dairy, and other livestock products and could benefit producers and consumers on both sides of the border. Greater competition and new markets have the potential to spur increased agricultural productivity and higher incomes in Pakistan if the required public investment, macrostability, and overall security situation enable medium-term private investment in agricultural production, processing, and trade, particularly in high-value products.

References

- Alderman, H., and M. Garcia. 1993. *Poverty, Household Food Security, and Nutrition in Rural Pakistan*. International Food Policy Research Institute Research Report 96. Washington, DC: IFPRI.
- Ali, M. 1990. "The Price Response of Major Crops in Pakistan: An Application of the Simultaneous Equation Model." *The Pakistan Development Review* 29 (3 & 4) (Autumn-Winter): 305-325.

- Anderson, K., M. Kurzweil, W. Martin, D. Sandri, and E. Valenzuela. 2008. *Measuring Distortions to Agricultural Incentives, Revisited*. Policy Research Working Paper 4612. Washington, DC: World Bank.
- Anderson, K., and W. Martin, eds. 2008. *Distortions to Agricultural Incentives in Asia*. Washington, DC: World Bank.
- Anderson, K., and S. Nelgen. 2013. "Updated National and Global Estimates of Distortions to Agricultural Incentives, 1955 to 2011." Spreadsheet. Washington, DC: World Bank. www.worldbank.org/agdistortions. Accessed June 2015.
- bin Najib, W., F. A. Baig, and A. Ansari. 2012. *Implications of Trade Liberalization between Pakistan and India*. Lahore: Punjab Board of Investment and Trade. <http://www.pbip.gov.pk/eng/system/files/Working-Paper-PAK-INDIA.pdf>.
- Chabot, P., and P. A. Dorosh. 2007. "Wheat Markets, Food Aid and Food Security in Afghanistan." *Food Policy* 32 (3): 334–353.
- Cornelisse, P. A., and S. Naqvi. 1987. *The Wheat Marketing Activity in Pakistan*. Islamabad: Pakistan Institute of Development Economics; Rotterdam: Centre for Development Planning, Erasmus University.
- Cororaton, C. B., and D. Orden. 2008. *Pakistan's Cotton and Textile Economy: Intersectoral Linkages and Effects on Rural and Urban Poverty*. Washington, DC: International Food Policy Research Institute.
- Dornbusch, R. 1974. "Tariffs and Non-traded Goods." *Journal of International Economics* 4 (May): 177–185.
- Dorosh, P. A. 2001. "Trade Liberalization and National Food Security: Rice Trade between Bangladesh and India." *World Development* 29 (4): 673–689.
- . 2008. "Regional Trade and Food Price Stabilisation in South Asia: Policy Responses to the 2007–08 World Price Shocks." *Pakistan Development Review* 47 (4): 803–813.
- Dorosh, P., S. J. Malik, and M. Krausova. 2011. "Rehabilitating Agriculture and Promoting Food Security Following the 2010 Pakistan Floods." *Pakistan Development Review* 49 (3): 167–192.
- Dorosh, P. A., and A. Salam. 2008. "Wheat Markets and Price Stabilization in Pakistan: An Analysis of Policy Options." *Pakistan Development Review* 44 (1): 71–88.
- . 2009. "Pakistan." In *Distortions to Agricultural Incentives in Asia*, edited by Kym Anderson and Will Martin, 379–408. Washington, DC: World Bank.
- Dorosh, P., and A. Valdès. 1990. *Effects of Exchange Rate and Trade Policies on Agriculture in Pakistan*. International Food Policy Research Institute Research Report 84. Washington, DC: IFPRI.

- FAO (Food and Agriculture Organization). 2014. Agricultural Statistics database. <http://www.fao.org/economic/est/statistical-data/est-cpd/ar/>.
- Faruqee, R., and J. R. Coleman. 1996. *Managing Price Risk in Pakistan's Wheat Markets*. Discussion Paper 334. Washington, DC: World Bank.
- GoI (Government of India). 2014. National Information Center. http://agmarkweb.dacnet.nic.in/SA_Pri_MonthD.aspx. Accessed June 2015.
- GoP (Government of Pakistan). Various years. *Pakistan Economic Survey*. Islamabad: Finance Division, Economic Adviser's Wing of the Ministry of Finance. <http://www.finance.gov.pk>.
- . Various years. *Pakistan Statistical Yearbook*. Islamabad: Pakistan Bureau of Statistics.
- . Various years. *Agricultural Statistics of Pakistan*. Islamabad: Pakistan Bureau of Statistics.
- Gopalan, S. 2013. *The Imperfect Substitutes Model in South Asia: Pakistan-India Trade Liberalisation in the Negative List*. London: International Growth Centre.
- Gulati, A., and G. Pursell. 2009. "Distortions to Agricultural Incentives in India and Other South Asia." In *Distortions to Agricultural Incentives: A Global Perspective, 1955 to 2007*, edited by Kym Anderson. London: Palgrave Macmillan; Washington, DC: World Bank.
- Hamid, N., I. Nabi, and A. Nasim. 1990. *Trade, Exchange Rate, and Agricultural Pricing Policies in Pakistan*. Washington, DC: World Bank.
- IMF (International Monetary Fund). 2014. International Financial Statistics. Accessed June 17, 2014. <http://data.imf.org>.
- Krueger, A. O., M. Schiff, and A. Valdès. 1988. "Agricultural Incentives in Developing Countries: Measuring the Effect of Sectoral and Economywide Policies." *World Bank Economic Review* 2 (3): 255–272.
- Memon, N., F. Rehman, and F. Rabbi. 2014. *Pak-India Trade Liberalization: How Will Pakistan's Manufacturing Sector Fare? A Comparative Advantage Analysis*. Working Paper. Karachi: Manzil Pakistan.
- Nabi, I. 1997. "Outward Orientation of the Economy: A Review of Pakistan's Evolving Trade and Exchange Rate Policy." *Journal of Asian Studies* 8 (1): 143–163.
- Persaud, S. 2010. *Price Volatility in Afghanistan's Wheat Market*. US Department of Agriculture Economic Research Service Outlook Report WHS-10d-01. Washington, DC: USDA.
- Pursell, G., A. Khan, and S. Gulzar. 2011. *Pakistan's Trade Policies: Future Directions*. IGC Working Paper. London: International Growth Centre.
- Rashid, S., P. A. Dorosh, M. Malek, and S. Lemma. 2013. "Modern Input Promotion in Sub-Saharan Africa: Insights from Asian Green Revolution." *Agricultural Economics* 444 (6): 705–721. <http://onlinelibrary.wiley.com/doi/10.1111/agec.12083/abstract>.

- Salam, A., and M. M. Mukhtar. 2008. "Public Intervention in Pakistan's Wheat Market: The Story of Two Agencies." In *From Parastatals to Private Trade: Lessons from Asian Agriculture*, edited by Shahidur Rashid, Ashok Gulati, and Ralph Cummings Jr. Baltimore: The Johns Hopkins University Press.
- Sayed, A. 2010. "Synthesis Report" for the Study on the State of Domestic Commerce in Pakistan for the Ministry of Commerce, Government of Pakistan. Islamabad: Innovative Development Strategies.
- USDA (United States Department of Agriculture). 2013. *Grain and Feed—Afghanistan. April 8, 2013*. Washington, DC: USDA Foreign Agricultural Service, Global Agricultural Information Network. http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Grain%20and%20Feed%20-%20Afghanistan_Kabul_Afghanistan_4-8-2013.pdf.
- Valdès, A. 2013. *Agriculture Trade and Price Policy in Pakistan*. Policy Paper Series on Pakistan PK 17/12. South Asia Poverty Reduction and Economic Management Unit. Washington, DC: World Bank.
- World Bank. 2004. *Trade Policies in South Asia, Volume II: An Overview*. Washington, DC: World Bank.
- . 2005. Agricultural Price Distortions website, "Pakistan." Washington, DC: World Bank. <http://go.worldbank.org/U32NJLFN10>.
- . 2010. *Food Price Increases in South Asia: National Responses and Regional Dimensions*. Washington, DC: World Bank.
- . 2014a. *Pink Sheet*. Washington, DC: World Bank. <http://go.worldbank.org/4ROCCIEQ50>.
- . 2014b. *Mitigating the Impact of Price Instability on Poverty in Pakistan: The Effectiveness of Public Grain Stocks and Price Stabilization Policy*. Washington, DC: World Bank.

Annex A: Methodological Framework

The nominal rate of protection of commodity i is defined as

$$NRP_i = (P_i / P_i') - 1$$

where P_i is the domestic market price of commodity i and P_i' is the border price of commodity i at the same location (the nominal exchange rate E in PKR/foreign currency units, multiplied by the world price at the border Pw_i).⁴⁰

In the case where the only price distortion is because of a simple ad valorem tariff tm_i , the NRP of commodity i measured at the border is

$$NRP_i = (P_i / P_i') - 1 = [E * Pw_i * (1 + tm_i) / (E * Pw_i)] - 1 = (1 + tm_i) - 1 = tm_i.$$

Similarly, to account for distortions in the costs of inputs, the effective rate of protection of commodity i , ERP_i , is based on the ratio of value added at domestic market and border prices:

$$ERP_i = (VA_i / VA_i') - 1,$$

where VA_i and VA_i' are the value added at private and social (undistorted) prices:

$$VA_i = P_i Q_i - \sum_j a_{ji} * Q_i * P_j,$$

$$VA_i' = P_i' * Q_i - \sum_j a_{ji} * Q_i * P_j',$$

and a_{ji} is the quantity of input j needed to produce a unit of output of commodity i .

40 To capture the effects of distortions in the exchange rate, a hypothetical exchange rate in the absence of distortions, E' is used. In the Krueger, Schiff, and Valdès (1988) methodology followed by Dorosh and Valdès (1990), equilibrium exchange rates in the absence of import tariffs and foreign exchange restrictions were calculated using two alternative methodologies—a trade elasticities approach and a real exchange rate regression approach.