DISTORTIONS IN INCENTIVES TO PRODUCTION OF MAJOR CROPS IN PAKISTAN: 1991-2008

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ABSTRACT

This article describes the main policy interventions in the production and marketing of wheat, rice, cotton and sugarcane crops in Pakistan and estimates the incentives or disincentives faced by farmers in their domestic production during the period of 1991 to 2008. Empirical estimates of the protection coefficients suggest continuing taxation of wheat production. In the case of rice, production of long grain basmati has been taxed while that of coarse varieties somewhat protected. In the case of cotton and sugarcane crops, the major cash crops and sources of raw material for the textile and sugar industries, the picture emerging from the analysis is somewhat mixed. For cotton, which was taxed in the 1990s, the incidence of taxation has declined. As cotton imports have been on the rise, protection coefficients based on import parity prices still suggest implicit taxation of domestic production. For sugarcane, the analysis of export parity prices indicates protection of domestic production, but analysis of import parity prices indicates taxation.

Keywords: agricultural policy; major crops; markets; distortions; incentives; subsidy; implicit taxation; protection coefficients; Pakistan.
JEL classification codes: Q18, O13.

1. INTRODUCTION

Agriculture accounts for 21 percent of Pakistan's Gross Domestic Product (GDP) and is the main source of income for 68 percent of the population that lives in the countryside. Crop production, which covers an area of 23 million hectares and involves 6.62 million small, medium and large farms, accounts for about 50 percent of the agriculture sector's share of GDP. Most of Pakistan's crop production depends on irrigation, as rainfall is both low and concentrated during the summer months. Pakistan has a long history of government interventions in farm input and output markets. These interventions have included monopoly

procurement (inherited at the time of independence and continuing through the 1950s) of commodities such as wheat and rice (Niaz 1995); public sector monopolies of exports and imports; establishment of support prices for crops; restrictions on commodity movements; zoning for sugar mills; and subsidized issue price of wheat procured at support prices and imported in the public sector.[1] Some of these interventions, such as procurement and import monopolies, were aimed at providing cheap food to the urban population, while others, such as public sector monopolies of cotton and rice exports, were established to eliminate trade malpractices and develop export markets. Support prices were aimed at providing a floor for market prices in the post harvest season (Salam 2001). In addition, input subsidies were introduced to encourage the use of modern inputs and technology in order to promote agricultural development. Despite their intentions, however, these policy interventions have also distorted agricultural prices and producer incentives and lowered the real prices of tradable commodities (Hamid, Nabi and Nasim 1990, Dorosh and Valdes 1990).

Faced with a growing budget deficit, a rising debt burden, and mounting pressure from donors, as well as increasing evidence about the inefficiency of the public sector and the failure of public sector institutions to address emerging challenges, in the mid-1980s the government embarked on a series of economic reforms under a Structural Adjustment Program. The major thrust of these reforms was to reduce public sector interventions and increase reliance on market forces. Under these reforms, explicit taxes and tariffs were reduced (Nabi 1997). As a result, the average rate of applied customs duties declined from 47.2 percent in 1996-97 to 19.6 percent in 2002-03 for agricultural imports, and from 40.8 percent to 16.9 percent for industrial products (World Bank 2004).

This study estimates the distortions faced by farmers in their production of wheat, rice, cotton and sugarcane, important food and cash crops which are also major imports and exports, during the 1990-91 to 2007-08 period. While most of the period covered in the analysis is in the aftermath of the economic reforms, in some cases the reforms were under way but not fully implemented.

Together, the four crops under study account for about 64 percent of the annual crop area and about 90 percent of the value added by major agricultural crops in Pakistan (Government of Pakistan 2008).[2] These crops are also important for their forward and backward linkages in the economy and are the key to the performance of the crop sector. While the markets for these crops have faced many of the government interventions noted above, these interventions have seldom been based on in-depth analysis and their objectives have often conflicted with each other.

The remainder of this article is organized as follows. The methodology used to estimate the distortions faced by farmers is explained in section 2. Sections 3 through 6 describe the economic importance, discuss government policies and interventions, and estimate and discuss the distortions in producer incentives for each of the four commodities. In section 7, the empirical estimates of these distortions in incentives are compared with estimates from other studies. Limitations of the data and analysis are explained in section 8. The paper concludes in section 9 with a discussion of the implications of the distortions in incentives and some of the emerging challenges concerning commodity pricing in Pakistan.

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[1] The issue price is the price at which the government releases wheat from its stocks to flour mills.
[2] Appendix Table 1 presents data on the area and production of these crops between 1991 and 2008.

2. METHODOLOGY AND DATA USED FOR ESTIMATING DISTORTIONS

International prices represent the opportunity cost to a country of producing various commodities domestically (Tsakok 1990). Thus, world commodity prices provide a reference and benchmark for domestic prices and indicate whether or not a country is an efficient producer of a particular commodity. The nominal protection coefficient (NPC) for a given commodity is the ratio of its domestic price to its international price. The NPC for a commodity i is defined as:

$$NPC_i = Pd_i / Pw_i$$

where Pd_i is the domestic price of commodity i and Pw_i is the international price of commodity i, converted into local currency, at a comparable point in space and time.

The NPC indicates any divergence between the domestic and international prices of a given commodity, which reflects the presence of market interventions such as taxes, subsidies, government controlled prices, and other policy instruments. Thus, the NPC provides an empirical estimate of any distortions (i.e., protection or taxation) for production of that commodity. It also provides a measure of the incentives or disincentives for the domestic production of a given commodity (Appleyard 1987). More specifically, if the NPC = 1, it is a neutral situation. That is, there is neither an incentive nor a disincentive for domestic production. If NPC > 1, there is positive protection (i.e., a subsidy) for domestic production. Conversely, if NPC < 1, there is negative protection (i.e., a tax) for domestic production.

To estimate the distortions affecting the production of wheat, rice, cotton, and sugarcane, for each commodity the producer prices prevailing in the domestic market during the harvest /post-harvest period were examined and compared with their relevant international prices. The corresponding international prices are calculated using the actual export or import parity prices of these commodities, estimated from the relevant export or import price data, but excluding any customs duties and other taxes. These international prices provide a measure of the opportunity cost of the resources used in the domestic production of a given commodity. Two important points about the domestic and international prices used in the analysis in this article are in order. First, concerning domestic prices, the government has followed a policy of annually reviewing and announcing support prices for wheat, rice, cotton, and sugarcane. These support prices have been intended to provide price floors during the harvest season, when market prices tend to fall, especially in good crop years. This price support policy was not meant to replace the market mechanism, but rather to correct market shortcomings and failures (Salam 2001). Thus, the analysis of domestic prices here has been confined to market prices prevailing during the harvest/post-harvest season (i.e., actual prices received by the growers). In addition, the prices used relate to the major producing area markets for each of the commodities. Second, regarding international prices, actual import and export prices have been used to estimate the import and export parity prices. Actual prices were preferred because quoted international prices may vary from those at which transactions actually occur, due to quality, timing, mode of payment and delivery, or other practical considerations. More specifically, in calculations of export / import parity prices, international prices were adjusted

for the relevant domestic marketing, transport, handling, and processing charges in order to make them comparable in space with the domestic prices. The use of actual export prices also helps to address the issue of quality differences and the resulting price differences between domestic and international commodities.

The exchange rate during the period covered in the analysis has been free and floating, and a recent estimate of the equilibrium exchange rate (Dorosh and Salam 2007) did not find much difference between the official and equilibrium exchange rates. Accordingly, the official exchange rate, as reported in the Pakistan Economic Surveys (Government of Pakistan, 2006, 2008), has been used to estimate import or export parity prices for the four commodities studied in this article.

The NPCs described above account only for the distortions in output markets; they do not consider interventions and any resulting distortions in input markets. This issue can be addressed by using effective protection coefficients (EPCs), which show how value added, rather than the gross value of production, is affected. Thus, the EPCs account for differences across industries in the value added share of output as well as distortions to intermediate input prices. However, estimating EPCs is much more demanding than estimating NPCs in terms of the data requirements, which may not be readily met. Moreover, compared to output distortions, farm input subsidies, on average, have a small overall impact on value added (Anderson et al 2007). During the bulk of the analysis period (1990-91 to 2007-08), most of the direct interventions in input markets and subsidies on seed, fertilizers, pesticides, credit, etc. had either been totally eliminated already or were in the process of being eliminated. However, in the wake of rising fertilizer prices in the world market, fertilizer subsidies were reintroduced in 2006. Nevertheless, these subsidies are common to all crops and are not crop specific. Thus, the protection coefficients (NPCs) estimated for the current analysis should provide useful insights about the levels of protection/assistance in place for the selected crops in general and the comparative picture in particular.

3. WHEAT: ECONOMIC IMPORTANCE, GOVERNMENT POLICIES, AND ESTIMATES OF DISTORTIONS

Wheat, which is the most widely grown crop in Pakistan and a staple food, is planted over an area of more than 8 million hectares annually and accounts for 66 percent of the total area planted for food grains, estimated at around 12 million hectares. The annual production of all food grains has averaged 31 million tons, with wheat production hovering around 21 million in the recent past, or 68 percent of total food grains production. The share of wheat in the total cropped area in Pakistan has ranged from 36 to 39 percent and it contributes 39 percent of the value added from major crops (Government of Pakistan 2008). Wheat is grown all over the country, under both irrigated and rain-fed conditions, and about 55 percent of its area is sown on farms operating less than 12.5 acres (Government of Pakistan 2003).

3.1. Government Policies and Interventions

Wheat production, milling, and marketing are all in the private sector. However, because of the importance of wheat to both consumers and producers, all governments since the country's independence have intervened in the wheat market. The government interventions have been aimed, inter alia, at increasing production, maintaining incentives for wheat farming, keeping wheat prices within reach of consumers, and controlling inflation (Salam and Mukhtar 2008). In the wake of the deregulation of the economy and the increasing role of the private sector, most of the interventions in the wheat market have either been eliminated or are being phased out. Nevertheless, the government continues to announce support prices, procures substantial quantities of wheat in order to maintain the support price, holds stocks for food security reasons, and manages wheat import levels to achieve its consumer pricing goals. The issue price for the provision of domestically-procured and imported wheat from government stocks to the flourmills is subsidized to stabilize and exercise some control over market prices for wheat flour (Cornelisse and Naqvi (1987), Hamid, Nabi, and Nasim (1990), Dorosh and Valdes (1990), and Dorosh and Salam (2008).

3.2. Prices and Distortions in the Wheat Market

Data on the domestic market prices of wheat prevailing during the harvest season and the corresponding import parity prices are presented in Table 1. As Pakistan has been a regular wheat importer, the import parity price is the relevant measure of the opportunity cost of domestic wheat production. An examination of these data indicates that throughout the 1990-91 to 2007-08 period, producer prices of wheat in the domestic market have been substantially below the corresponding import parity prices.

As shown in Table 1, the NPCs ranged from 0.53 to 0.95, with an overall average value of 0.72. These coefficients reflect large transfers of resources from wheat farmers and surplus wheat-producing regions, adversely impacting the incomes and well being of wheat farmers. Such resource transfers have naturally discouraged investments in wheat farming and have had a negative impact on its production. Thus it is no surprise that Pakistan continues to have a wheat deficit and to rely on expensive imports to bridge the gap between wheat demand and supply.

Table 1 also presents data on the support prices of wheat along with government wheat procurements, which provide some useful insights about the wheat sector and wheat pricing policy. The support prices have been revised irregularly, 11 times in 18 years. However, two time periods stand out: (1) 1996-97 to 1998-99, when the price was raised from Rs. 173/40 kg to 240/40 kg for the 1996-97 crop and retained for the next two crop years; and (2) 1999-00 to 2002-03, when the price was raised to Rs. 300/40 kg in 1999-00 and maintained at the same level for the next three crop years (i.e., until 2002-03).

In 1992-93, when the NPC was 0.72 and the support price was raised in 1993-94 by 19 percent, the NPC rose to 0.95 but plunged to 0.53 by 1995-96. The NPC spiked to 0.78 during 1996-97 when producer prices in the domestic market rose in the wake of a 38 percent rise in the support price. For the 1999-00 crop, the NPC was estimated at 0.81, as the wheat support price was raised by 25 percent to Rs. 300/ 40 kg, which also pushed up producer prices. In 1999-00, there was a record procurement of 8.58 million tons, out of total production of over 21 million tons. As the Government had sufficient stocks of wheat, its support prices were not

revised for the next three crop years. As a result, the NPCs fell sharply, from 0.81 in 1999-00 to 0.58 in 2003-04.

Table 1. Domestic and International Prices of Wheat in Pakistan: 1991-2008

Year	Import parity price Rs/ 40 kg	Domestic market price Rs/ 40 kg	NPC	Support price Rs. / 40 kg	Procurements Million tons
1990-91	144	121	0.84	112	3.16
1991-92	183	134	0.73	124	3.16
1992-93	193	139	0.72	130	4.12
1993-94	178	170	0.95	160	3.64
1994-95	219	176	0.80	160	3.74
1995-96	349	185	0.53	173	3.45
1996-97	350	273	0.78	240	2.72
1997-98	346	259	0.75	240	3.98
1998-99	303	261	0.86	240	4.07
1999-00	365	297	0.81	300	8.58
2000-01	504	275	0.55	300	4.08
2001-02	523	292	0.56	300	4.04
2002-03	522	305	0.58	300	3.51
2003-04	567	385	0.68	350	3.40
2004-05	581	432	0.74	400	3.93
2005-06	458	411	0.90	415	3.88
2006-07	804	437	0.54	425	4.42
2007-08	1232	750	0.61	625	3.92
Average: 91-00			0.78		
Average: 01-08			0.65		
Average: 91-08			0.72		

Note: Import parity prices estimated from the actual import prices reported in Pakistan Economic Survey (Statistical Supplement) 2007-08. Incidentals and related costs of importing wheat adapted from various annual Wheat Price Policy reports of Agricultural Prices Commission. Data on support and domestic market prices and wheat procurements also obtained from the Agricultural Prices Commission's Wheat Price Policy reports. To represent the average situation in Pakistan, both domestic and import parity prices of wheat were estimated for Lahore, the major consumption centre located in the wheat producing region.

International prices of wheat have surged in the last couple of years. However, in spite of the substantial revisions in support prices, domestic producer prices have lagged far behind. The NPCs for the 2006-07 and 2007-08 crops are estimated at 0.54 and 0.61, respectively, reflecting the deterioration in incentives to wheat farmers. As the country was in the midst of a domestic food crisis and experiencing pressure from rising international wheat prices, the

government was forced to abandon many of the market oriented policy initiatives in favor of administrative measures and interventions to insulate the domestic market from the developments in world markets, which were a response to the worsening global food situation.

4. RICE: ECONOMIC IMPORTANCE, GOVERNMENT POLICIES, AND ESTIMATES OF DISTORTIONS

Pakistan is famous for producing and exporting long-grain aromatic "basmati" rice. It also exports substantial quantities of coarse rice. Pakistan ranks 12th in the world in terms of rice production and is the world's 5th largest rice exporter, accounting for 9 percent of global rice exports. Pakistan's rice exports, averaging 3.2 million tons in recent years, have earned over US$1 billion in foreign exchange annually (Government of Pakistan 2008). The rice crop, annually sown over an area averaging 2.5 million hectares, accounts for 18 percent of the area sown for food grains. Annual rice production averages 5.1 million tons and accounts for 18 percent of the total output of food grains.

4.1. Government Policies and Interventions

Rice production, marketing and trade have been subjected to several policy interventions, including monopoly procurements and exports in the public sector; levying of export taxes; restrictions on internal movements and the banning of the cultivation of certain varieties; and restrictions on rice sowing in certain areas and promotion of cultivation in others to reclaim saline lands. Until 2001-02, the government annually reviewed and announced the support price of rice (paddy).[3]

The support price was protected through market intervention and government procurements of paddy. In the wake of the economic reforms and the expanding role of the private sector in the economy, since 2003-04 the government's role in the rice sector has been limited to occasional and irregular announcements of indicative paddy prices, while the milling, marketing, and trade of rice are all in the private sector.[4]

Currently, there is no export tax on rice, but imports are subject to a 10 percent customs duty. Following the very high international and domestic prices experienced in 2007-08, in April 2008 the government fixed minimum export prices (MEP) for various varieties of rice: $1500/ton for Super basmati, $1300/ton for basmati, $1000/ton for IRRI-9, and $750/ton for IRRI-6 (The World Trade Review 2008).[5] The MEP restrictions were lifted in August for IRRI rice and in October 2008 for other varieties.

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[3] Paddy is unhusked rice.

[4] A lot of confusion remains about the concept of indicative price, which involves limited intervention in the market to protect a commodity's price. In contrast, with support prices, the government continues to intervene as long as is necessary to protect the commodity's price.

[5] Both IRRI-6 and IRRI-9, which were developed at the International Rice Research Institute (IRRI), are coarse varieties of rice.

4.2. Prices and Distortions in the Rice Market

To examine the wedge between the domestic and international prices of rice (paddy), export parity prices of rice paddy were calculated using the actual export prices for rice and compared with the domestic market prices for paddy (see Table 2). Because of the large differences between the quality and prices of long grain basmati and coarse varieties of rice, the two types of rice are analyzed and discussed separately below.

Table 2. Domestic Market and Export Parity Prices of Basmati and Coarse Paddy in Pakistan: 1991-2008

Year	Export parity price of basmati paddy Rs/ 40 kg	Domestic price of basmati paddy Rs/ 40 kg	NPC for basmati Paddy	Export parity price of coarse paddy Rs/40 kg	Domestic price of coarse paddy Rs/ 40 kg	NPC for coarse Paddy
1990-91	167	143	0.86	72	78	1.08
1991-92	167	158	0.95	173	98	0.57
1992-93	184	190	1.03	108	112	1.03
1993-94	201	194	0.97	100	98	0.98
1994-95	198	192	0.97	115	137	1.19
1995-96	215	231	1.07	227	181	0.80
1996-97	315	296	0.94	161	164	1.02
1997-98	355	297	0.84	176	205	1.17
1998-99	395	362	0.92	195	234	1.20
1999-00	481	361	0.75	184	203	1.10
2000-01	477	300	0.63	175	180	1.03
2001-02	512	379	0.74	202	206	1.02
2002-03	509	495	0.97	198	218	1.10
2003-04	515	500	0.97	245	257	1.05
2004-05	565	543	0.96	293	338	1.15
2005-06	615	537	0.87	297	290	0.98
2006-07	671	594	0.89	325	310	0.95
2007-08	947	900	0.95	561	525	0.94
Average: 91-00			0.93			1.01
Average: 01-08			0.87			1.03
Average: 91-08			0.90			1.02

Note: Export parity prices estimated from export prices of rice reported in Pakistan Economic Survey (Statistical Supplement) 2007-08. Incidentals and related costs of exporting rice used in these estimations adapted from various annual Rice Price Policy reports of Agricultural Prices Commission. Export parity prices of basmati calculated at rice mills located in the basmati growing regions of the Punjab, while those of coarse paddy calculated at rice mills located in rice farming regions of Sindh. Domestic paddy prices are the averages of producer area markets located in the main basmati and IRRI growing areas of the Punjab and Sindh, respectively.

4.2.1. Basmati Rice (Paddy)

As shown in Table 2, with the exception of 1992-93 and 1995-96, the wholesale domestic market prices of basmati paddy were less than the corresponding export parity prices throughout the reference period. Thus, the NPCs were less than one for all but those two years. The implicit taxation indicated by these coefficients ranges form 3 to 37 percent and averages 10 percent per year over the study period. From 1997-98 to 2001-02, the implicit taxation of basmati production was generally quite high, but has since declined following the economic liberalization. In the wake of international food shortages, of rice in particular, the domestic market has quite closely tracked the developments in world markets during 2007-08.

4.2.2. Coarse Rice (Paddy)

Export parity prices of coarse paddy since 1990-91, along with domestic prices, are also reported in Table 2. These data provide a mixed picture regarding the protection of IRRI production. The NPCs during the reference period have ranged from 0.57 to 1.20, with a mean value of 1.02. The mean value of 1.02 reflects a low level of protection for IRRI production. The NPC estimates indicate that the production of coarse rice enjoyed protection in twelve years of the reference period but faced implicit taxation in six years of the reference period. In recent years, as international rice prices have experienced a sharply rising trend and the share of rice exports in total production has increased, its domestic prices have been aligned quite closely with export markets.

There is a large domestic market in Pakistan for coarse rice, which, along with wheat, is a staple food for a large section of the country's population. This has helped fuel domestic demand and support high domestic prices for the commodity. In addition, the bulk of coarse rice exports are destined for low income countries. Exports of coarse rice to low income countries often have a higher proportion of brokens to cater to the demand from these importers. This may be one of the reasons for the resultant lower unit export prices of Pakistani coarse rice and may also partly explain why domestic prices have often been higher than the export parity estimates.

5. COTTON: ECONOMIC IMPORTANCE, GOVERNMENT POLICIES, AND ESTIMATES OF DISTORTIONS

Pakistan is the world's 4th largest producer of cotton. Cotton is Pakistan's largest cash crop. It is second only to wheat in terms of area planted, hovering around 3 million hectares and accounting for 15 percent of the total cropped area. Annual cotton production has averaged 2 million tons in recent years and its share in the value added by major crops is 24 percent (Government of Pakistan 2008). Textiles, the country's largest industry and the major source of employment in manufacturing, depends on cotton farming for raw material.[6] Cotton and cotton products contribute 65 percent of the foreign exchange earned from the export of merchandise goods. A valuable by-product of cotton farming is cottonseed, a raw material for the vegetable oil industry and feed for livestock and dairy farming. Cotton picking, a highly-

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[6] Intersectoral linkages between the raw cotton, cotton lint and yarn and textile industries are modeled by Cororaton and Orden (2008).

labor intensive activity performed by female workers from both farm and non-farm households, is an important source of supplemental income for families in the countryside.

According to the Agricultural Census (Government of Pakistan 2003), in 2000, 1.63 million of the 6.62 million total farms in the country were cotton growers. A great majority of cotton growing farms operated less than 12.5 acres, but these small farms account for 50 percent of the area under cotton. Among farm households that produce cotton, about 40 percent of their total income comes from cotton production. The 20 percent decline in world prices during the late 1990s adversely affected these households. [7] With its many forward and backward linkages, cotton production occupies a unique position in Pakistan's economy. Its performance holds the key to not only the growth and development of agriculture, but also to the robust health of the overall economy. A good cotton crop is essential for the sustainable development of agriculture, food security, and the success of poverty alleviation efforts.

5.1. Government Policies and Interventions

The Cotton Export Corporation (CEC), established in 1974, had a monopoly in cotton exports until 1986-87, when its role started to decline while the role of the private sector rose. Exports of cotton during the 1990s were subject to a MEP and a system of benchmark prices. The MEP for cotton was fixed daily by an inter-agency committee and announced by the State Bank of Pakistan. The benchmark price, determined on the basis of the ex-gin price of cotton lint, and export incidentals, provided the upper ceiling on the exporters' return, since the difference between the MEP and the benchmark price formed the basis for calculating the export tax. The MEP and system of benchmark prices were introduced to prevent under invoicing of exports and ensure a definite amount of revenue collection from export duties. But it suppressed the domestic prices of cotton relative to international prices, distorting the incentives to its production.

The system also insulated domestic markets from the developments in international cotton markets. Although the pricing system failed to provide any incentives to growers and exporters, the domestic processing industry benefited from the supply of cheap raw material. On the one hand, low cotton prices in the domestic market encouraged its wasteful uses, while on the other hand it discouraged its domestic production. The export duty on cotton was abolished in 1994. Both exports and imports are now in the private sector and government intervention is limited to an annual review of the support prices of seed cotton and limited public sector procurements (Salam 2008).

5.2. Prices and Distortions in the Cotton Market

Domestic market prices of seed cotton along with its export and import parity prices are presented in Table 3.[8]

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[7] Household-level simulations suggest that if cotton prices had increased rather than declined 20 percent during the late 1990s, the percentage of cotton-producing households living below the poverty line in 2001 would have been reduced from 40 to 28 percent (Cororaton et al 2008).

[8] Because Pakistan has been importing as well as exporting cotton during the period covered in this study, both import and export parity prices were estimated to reflect the opportunity cost of domestic production.

Table 3. Domestic Market and International Prices of Seed Cotton in Pakistan:
1991-2008

Year	Domestic price Rs/40 kg	Export parity price Rs/40 kg	NPC 1	Import parity price Rs/40 kg	NPC 2
1990-91	327	464	0.70	669	0.49
1991-92	334	387	0.86	581	0.58
1992-93	384	383	1.00	560	0.69
1993-94	497	447	1.11	877	0.57
1994-95	785	918	0.86	1185	0.66
1995-96	754	816	0.92	1119	0.67
1996-97	793	879	0.90	1204	0.66
1997-98	843	821	1.03	1178	0.72
1998-99	914	918	1.00	1046	0.87
1999-2000	641	640	1.00	1060	0.60
2000-01	900	858	1.05	1302	0.69
2001-02	761	648	1.17	1017	0.75
2002-03	914	816	1.12	1297	0.70
2003-04	1219	1136	1.07	1583	0.77
2004-05	885	899	0.98	1246	0.71
2005-06	1017	995	1.02	1318	0.77
2006-07	1110	1089	1.02	1389	0.80
2007-08	1468	1268	1.16	1519	0.97
Average: 91-00			0.94		0.65
Average: 01-08			1.08		0.77
Average: 91-08			1.00		0.70

Note: Export and import parity prices estimated from the export and import prices reported in Pakistan
Economic Survey (Statistical Supplement) 2007-08. Incidentals and related costs of exporting and
importing cotton adapted from annual price policy reports of Agricultural Prices Commission on
seed cotton. NPC 1 and NPC 2 are nominal protection coefficients estimated in relation to export
and import parity prices, respectively. Export / import parity prices estimated at ginneries located
in main cotton producing regions, while domestic prices are the average of wholesale prices
prevailing in the main producer area markets during the harvest season.

The prices of seed cotton in both domestic and international markets were characterized
by marked fluctuations during the 1990-91 to 2007-08 period. The nominal prices of seed
cotton in the domestic market trended steadily upward through 1998-99, notwithstanding
wide fluctuations in the international prices of cotton. This upward movement in domestic
market prices seems to have been triggered by the 140 percent depreciation in the value of the
Pak Rupee between 1990-91 and 1998-99, which outlasted the impact that fluctuations in
international cotton prices had on domestic prices (Orden et. al 2005).

5.2.1. NPCs Based on Export Parity Prices
A comparison of export parity prices with the corresponding domestic market prices of
seed cotton (see Table 3) provides a mixed picture. The NPC (NPC 1) averaged 0.94 during
the 1990s and 1.08 from 2001 to 2008, while its average value for the entire period is 1.0. In 7
of the 18 crop years under study, export parity prices were higher than the domestic market
prices, but in 11 of the years, domestic prices were higher than the export parity prices. In

three of the years, domestic and export parity prices were so similar that the NPC was equal to 1. Thus, the NPC was less than 1.0 in 6 years but greater than 1.0 in 9 years. With the exception of 2004-05, all the years when cotton production was subjected to implicit taxation (i.e., NPC<1) were in the 1990s, when domestic production was substantially greater than domestic demand and the country exported large quantities of raw cotton. With the increasing requirements of the expanding textile industry and the rising share of imports in the last ten years or so, farmers have benefited from domestic prices that have fairly consistently been higher than the corresponding export parity prices.

5.2.2. NPCs Based on Import Parity Prices

Generally speaking, years when significant quantities of cotton were exported were characterized by higher export parity prices, while those years when there were considerable imports featured lower export parity prices. These data on export parity prices suggest that the implicit taxation of cotton has been arrested since 1997-98. In contrast, the data on import parity prices do not support this claim, as import parity prices have consistently been significantly higher than the domestic prices received by cotton farmers throughout the period. Accordingly, the NPCs based on the import parity prices (NPC 2) have been less than 1.0 every year, ranging from 0.49 to 0.97, with an average value of 0.70. This underscores the importance of increasing domestic production of cotton, which is cheaper than importing cotton, through various incentives and other measures to meet the ever-increasing requirements of the industry. During 2003-04 cotton imports were approximately 393,000 tons and comprised 19.4 percent of domestic cotton consumption. Cotton imports increased to 898,818 tons in 2007-08 (Government of Pakistan 2008).

6. SUGARCANE: ECONOMIC IMPORTANCE, GOVERNMENT POLICIES, AND ESTIMATES OF DISTORTIONS

Sugarcane, which is cultivated under irrigated conditions on an area of about one million hectares, accounts for 4-5 percent of Pakistan's total cropped area. Farms operating less than 5 hectares account for about half of the area cultivated for sugarcane. Pakistan ranks 5th in the world in terms of area cultivated for sugar, but 15th in terms of sugarcane production (Pakistan Sugar Mills Association 2005). Pakistan's sugar industry, which is comprised of 79 sugar mills and is the country's second largest agro-based industry, depends on sugarcane cultivation for its supply of raw material. All of the sugar mills are in the private sector. The installed capacity in the industry is sufficient to produce about 5 million tons of sugar in a given crushing season provided that an adequate supply of raw material is available. As the number of sugar mills has increased over time, from 32 in 1980 to 79 in 2005, so too has the area under sugarcane. The sugar industry is located mostly in the countryside in and around small and medium-sized towns, and has played a catalytic role in the promotion of rural development. With its many forward and backward linkages, sugarcane farming has opened vast regular and seasonal employment opportunities for skilled, semi-skilled and unskilled labor. However, the production, marketing, and processing of sugarcane are confronted with a host of problems. First, the sector has been characterized by unstable production, of both sugarcane and sugar. Total production of sugar in Pakistan has ranged from 1.93 million tons

(1990-91) to 4.75 million tons (2007-08), averaging over 3 million tons per year during the period of this study. The coefficients of variation of sugarcane production for Punjab and Sindh, the major sugarcane producing provinces, are estimated at 19 and 17 percent, respectively. Second, relations between the farmers and sugar mills remain tenuous at best, which has adversely affected the development of sugarcane and its related sub-sectors. The growers, facing ever increasing input prices and energy costs and recurring water shortages, have been wary of the uncooperative and often exploitative attitude of the mills' management. The mills, facing increasing competition from cheap imports and troubled by an irregular cane supply, complain about the poor quality of the raw material and overcrowding in the peak season (i.e., long queues of sugarcane trucks waiting for days outside the mills to unload their sugarcane).

6.1. Government Policies and Interventions

The large variation in sugar production has often resulted in both large surpluses and shortages of the commodity, which has led to price instability and recourse to international trade and world markets.[9] This has also required frequent government policy measures and interventions. The principal interventions in the sugarcane sector have been rationing of sugar, licensing of sugar mills, zoning for sugar mills, regulating sugar exports and imports through tariff and non tariff measures, imposition of a central excise duty on manufacturing of sugar and a general sales tax on sugar, and fixation of support prices of sugarcane. These policies have caused distortions in incentives for both the producers and millers. The distortions in incentives for sugarcane production resulting from government policy measures and interventions are discussed below.

6.2. Prices and Distortions in the Sugar Market

Pakistan has been an active participant in the international sugar market, often importing and exporting large quantities of sugar simultaneously (see Appendix Table 2). As shown in Appendix Table 2, during nine of the 18 years in the study period, Pakistan was a net exporter of sugar, with net exports ranging from 24,481 to 896,950 metric tons. During the other nine years, net imports of sugar ranged from 35,638 to 1,456,786 metric tons.[10] In view of this import-export situation, determining the economic prices (i.e., the opportunity costs of domestic production) of sugarcane in Pakistan is rather complex, requiring estimation of both import and export parity prices. Moreover, because the processing of sugarcane into sugar also entails considerable costs, estimating the economic price of sugarcane requires representative data on the costs of processing, sucrose recoveries, etc., which are not readily available and are often unreliable. The data on processing costs used in the analysis here are from the reports and files of the Agricultural Prices Commission, while the data on average annual sucrose recoveries are from reports prepared by the sugar industry. Similarly, data

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[9] Sugarcane and sugar production, prices, and trade are also often at the center of press reports, controversy, and acrimonious debate in various forums, including the national press and other media.

[10] Another notable feature of the sugar market has been the wide fluctuations in the unit value of imports and exports over this period, in both rupee and dollar terms (see Appendix Table 2).

regarding various costs involved in sugar imports were compiled and adapted from policy reports of the Agricultural Prices Commission and used to estimate import parity prices. Assuming symmetry of domestic costs in imports and exports, data on import costs were also used to calculate export parity prices for sugarcane.

The import and export parity prices, along with the domestic market prices of sugarcane, are reported in Table 4. Although the government announces support prices for sugarcane, the prices received by farmers have often differed from these, depending upon the crop situation and the prices of sugar in the market. Therefore, the average market price of sugarcane in Punjab and Sindh, the two provinces producing 90 percent of the country's sugarcane crop, has been used to represent the domestic market price and to estimate the NPCs presented in Table 4. Although in some years, the fob export cost of sugar was higher than the c and f costs of imported sugar, export parity prices have generally been much lower than import parity prices.

Table 4. Domestic Market, Export and Import   Parity Prices of Sugarcane in Pakistan

Year	Export parity Rs/40 kg	Domestic price Rs/40 kg	NPC 1	Import parity Rs/40 kg	NPC 2
1991-92	NA	16.88	NA	21.76	0.78
1992-93	NA	18.63	NA	19.75	0.94
1993-94	18.48	19.70	1.07	25.72	0.77
1994-95	23.48	21.20	0.90	35.58	0.60
1995-96	24.58	25.00	1.02	39.98	0.63
1996-97	0.00	39.00	NA	37.17	1.05
1997-98	28.05	37.00	1.32	42.76	0.87
1998-99	23.62	34.00	1.44	35.79	0.95
1999-00	31.32	38.50	1.23	30.57	1.26
2000-01	NA	47.50	NA	41.36	1.15
2001-02	42.07	42.00	1.00	44.76	0.94
2002-03	27.22	35.50	1.30	48.08	0.74
2003-04	28.00	34.50	1.23	45.26	0.76
2004-05	40.08	40.50	1.01	54.08	0.75
2005-06	55.56	60.00	1.08	64.57	0.93
2006-07	NA	60.00	NA	69.98	0.86
2007-08	46.50	57.50	1.24	66.56	0.86
Average: 92-00			1.16		0.87
Average: 01-08			1.14		0.87
Average: 92-08			1.15		0.87

Notes: Sugar prices, which formed the basis of calculating export parity prices, were compiled from the Pakistan Sugar Mills Association's Annual Report 2007 and from data on sugar exports and imports along with their prices from the Federal Bureau of Statistics (FBS) . Import parity prices were calculated from the data on sugar imports obtained from the FBS and the Agricultural Price Policy Institute's (formerly the Agricultural Prices Commission) annual reports on sugarcane. NPC 1 and NPC 2 are the estimated nominal protection coefficients, based on export and import parity prices, respectively. Domestic prices represent the average of the ex-mill prices paid by sugar mills for the purchase of sugarcane in the Punjab and Sindh. Export / import parity prices were also worked back to the sugar mill level to represent the average situation in these two provinces.

N/A: negligible quantities of import/exports or data not available.

6.2.1. NPCs Based on Export Parity Prices

As shown in Table 4, domestic market prices are generally higher than export parity prices. Thus, the NPCs calculated by using the export parity prices (NPC 1) suggest considerable protection of sugarcane farmers. The NPC averaged 1.16 during the 1992-2000 period but declined to 1.14 during the 2001-08 period, reflecting the fall in marginal protection to sugarcane in the recent past.

6.2.2. NPCs Based on Import Parity Prices

As shown in Table 4, in most years, domestic prices of sugarcane were below import parity prices and the NPCs based on import parity prices (NPC 2) are generally considerably below one, suggesting implicit taxation of domestic sugarcane production. There were, of course, a few years when these NPCs were greater than one, implying protection to domestic production. However, the average value of NPC 2 throughout the entire period is 0.87.[11]

6.2.3. Conclusions about Distortions in the Sugarcane Market

In summary, the domestic prices of sugarcane have generally been higher than export parity prices, but somewhat lower than import parity prices. Thus, domestic prices of sugarcane fall between these two measures of its opportunity cost. While annual trade in sugar (exports as well imports) may appear to be large in absolute terms, it represents only a small fraction of total domestic production, with imports averaging 10 percent and exports only one percent of domestic production during the last eight years. Thus, both the domestic demand-supply situation and government interventions in the market play important roles in determining the sugarcane prices paid to farmers by the mills. If we use the average of the import and export parity prices to indicate the opportunity cost of producing sugarcane, then the value of NPC is on average close to one, which to a large extent eliminates the evidence of distortions in domestic sugarcane prices. The picture that emerges from the foregoing analysis is quite interesting, but continuous monitoring of developments in world sugar markets, the domestic sugar sector, and its related sub-sectors in the economy is required in order to keep track of the developments in these markets and address the emerging issues and challenges to sugarcane farming and processing.

7. COMPARISON OF NPC ESTIMATES WITH RESULTS FROM PREVIOUS STUDIES

For comparison purposes, Table 5 summarizes the NPC estimates from this study and some previous studies by the World Bank and the United Nations Food and Agriculture Organization (FAO).[12]

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[11] It should be noted, however, that in the 1992-2000 period, there was greater variation in the annual NPC values than in the 2001-08 period.

[12] For additional studies see Hussain, Anwar and Hussain (2006).

Table 5. Summary of Nominal Protection Coefficients from Different Studies

Period of analysis	Study by	Wheat	Basmati	IRRI	Cotton	Sugarcane
Avg. 1972 – 77	Gotsch and Brown (1980)	0.75	0.5	0.54	0.63	0.55
Avg. 1976 – 80	Appleyard (1987)	0.76	0.5	0.68	0.8	1
Avg. 1976 – 84	Appleyard (1987)	0.72	0.48	0.71	0.8	0.93
Avg. 1991-2000	Present study	0.78	0.93	1.01	0.94	1.16 (0.87)
Avg. 2001-08	Present study	0.65	0.87	1.03	1.08	1.14 (0.87)
Avg. 1991- 2008	Present study	0.72	0.90	1.02	1	1.15 (0.87)
Avg.1990-1994 [NRAs] %	Dorosh and Salam (2009)	-27.1	-17.9	-0.5	-19.9	52.1
Avg. 1995-994 [NRAs] %	Dorosh and Salam (2009)	-20.2	-1.7	8.1	-7.9	54.3
Avg. 2000-05 [NRA] %	Dorosh and Salam (2009)	-13.9	-25.3	12.5	7.0	86.5

Note: NRA refers to nominal rate of assistance and is calculated by subtracting 1.0 from the NPCs. Negative signs indicate cases where NPCs are less than one.
    The figures showing NRAs indicate the percentage divergence between domestic and international prices.
NPCs given in parentheses in sugarcane column are based on import parity prices while those without parentheses are based on export parity prices.

An examination of these NPCs suggests that, notwithstanding the trend towards liberalization, implicit taxation of wheat continues, with the average taxation remaining at about 25 percent of the border price.

The implicit taxation of basmati rice, an important export and food crop, has sharply declined over time. It is worth mentioning that in the past basmati rice was subject to numerous interventions at the marketing stage, including monopsony procurements, restrictions on its movements, and monopoly exports by the Rice Export Corporation of Pakistan (RECP) during the 1970s, which continued into the 1980s. Economic liberalization, the phasing out of trade restrictions, and the dismantling of the RECP have worked to greatly reduce the wedge between domestic and border prices and hence the implicit taxation of basmati. The coarse rice, which was subject to some of the same restrictions and interventions as basmati rice, as well as implicit taxation, has also benefited from the economic reforms. As shown in Table 5, coarse rice received a small amount of protection during the 1991-2008 period, while it was implicitly taxed during the 1970s and 1980s. Cotton was also heavily taxed in the 1970s and 1980s. However, starting in the late 1990s, incentives for cotton production seem to have improved significantly. With an average NPC of 1.00 during the 1991-2008 period, domestic prices appear to have tracked international prices rather well.

Economic liberalization and the program of policy reforms also seem to have benefited the country's sugarcane production. Between 1972 and 1977, the NPC for sugarcane averaged 0.58, reflecting a high level of implicit taxation of domestic production. However, during the 1976-84 period, with an average NPC of approximately 0.93, the situation for the domestic sugarcane industry had improved considerably. The situation for the 1991-2008 period is mixed. During this period, Pakistan both exported and imported sugar. Using export parity prices, the average NPC was 1.15, reflecting protection for domestic sugarcane production, while the average NPC based on import parity prices was 0.87, suggesting implicit taxation of domestic sugarcane farmers.

The results of the present study generally agree with the results reported in the World Bank study (Dorosh and Salam 2009) concerning the direction of support (i.e., implicit taxation or protection) for the four commodities, but are different in terms of the magnitude of that support. The differences in the magnitude or size of the coefficients of support arise for various reasons, for example due to the different time periods of the two analyses; variations in the reference prices used to calculate import or export parity prices; and variations in the costs used to calculate import or export parity prices. In addition, for commodities falling into both export and import categories, the use of the import versus the export parity price could significantly affect the resulting estimates of economic prices. The reference point of comparison can also affect the size of the protection coefficient. For example, one of the main reasons for the differences in the magnitude of support for wheat in the two studies is the point of comparison. That is, in the case of the World Bank study (Dorosh and Salam 2009), the point of comparison is the port city of Karachi, while in the present study the protection coefficient has been calculated at Lahore, which increases the costs for imports, as the wheat must be transported to an interior metropolitan area in the main wheat-producing region of Pakistan.

8. LIMITATIONS OF THE DATA AND ANALYSIS

The estimation and analysis of NPCs require data on both the domestic and international prices of the commodities. In the current analysis, the domestic prices of wheat, basmati and IRRI paddy, seed cotton and sugarcane relate to the harvest and post harvest seasons of the respective commodities. Data from the price policy reports of the Agricultural Prices Commission (now the Agriculture Policy Institute), which report commodity prices as being those received by the farmers in the main producing area markets, were adopted for the analysis in this paper. Actual import / export prices of wheat, rice and cotton, as published in the Pakistan Economic Survey, were used to work back the import/export parity prices for wheat, rice (paddy) and seed cotton. In the case of sugar, import / export prices as reported by the Pakistan Sugar Mills Association in its annual reports for 2005 and 2007 were supplemented with data obtained from the Federal Bureau of Statistics.

The estimation of import/export parity prices of commodities like paddy, seed cotton and sugarcane from the international prices of their respective imported /exported products (i.e. rice, cotton and sugar) requires data not only on the various commodities' marketing costs, but also on their processing costs, technical coefficients, product recoveries and prices. The Agricultural Prices Commission has invested significant resources and time to collect, refine, and update such data for use in its policy related analysis. Because this data set has been scrutinized by many and was the best available, it was adapted for use in the current analysis.

The comparison of domestic and international prices has been done using data from comparable locations for the various commodities. For wheat, the producer prices used in the analysis represented the average of the producer area markets during the harvest season. The price of wheat imported at Lahore, a large consumer centre located in the heart of the wheat producing region, inclusive of transportation and other related costs, was adopted to represent the average situation. For basmati paddy, producer prices used in the analysis are harvest/post harvest season prices prevailing in producer area markets of the Punjab, where basmati production is concentrated. Export parity prices for paddy, based on the export prices of basmati rice, were estimated for rice mills located in the main basmati producing areas. For coarse varieties of rice, the domestic price was the average of prices prevailing in the producer area markets of Sindh, where the bulk of coarse rice is produced. Export parity prices of coarse rice were estimated for rice mills located in the producer areas of Sindh.

In the case of cotton, crop farmers produce and sell seed cotton. The domestic price used was the average of the wholesale prices of seed cotton prevailing in the main producing area markets during the harvesting and post harvesting season, normally extending from October to January. Ex-gin export prices of seed cotton were worked back from the actual export prices of cotton for ginneries located in the major cotton growing regions. For sugarcane, domestic prices represent the average of prices received by farmers in the major sugarcane growing areas of the Punjab and Sindh. The parity prices of sugarcane at the mill level were worked back from the export/import prices to represent a typical sugar mill using the weighted average of the transport and market costs for Punjab and Sindh. Given the wide dispersion of rice mills, cotton gins, and sugar mills across various areas, there is bound to be some variation that is not captured in the estimated export/import parity prices. However, this is also the case with domestic producer prices, which reflect the average situation in the main producing area markets for the respective commodities.

The actual export and import prices that were used to calculate the export or import parity prices of the commodities are annual averages and thus mask whatever variation occurred during the course of the year. But such variation is inescapable in this type of analysis and a precise calibration of the timing of import and export prices with domestic prices is well nigh impossible. Another point worth mentioning in this context is the impact of transportation, marketing, handling and other costs related to international trade. The structure of markets and the efficiency of the operations involved also affect the resulting import/ export parity prices of the commodities. Furthermore, the efficiencies and inefficiencies of the processing sub-sectors for commodities like paddy, seed cotton and sugarcane affect their parity prices since they are worked back from the prices of the final products. Thus, in addition to government policies, the kind of market infrastructure, the prevailing market structures, and the efficiency of the processing sector affect the degree of integration or the extent of insulation of domestic markets from developments in world commodity markets. Moreover, some of the distortions in producer incentives may be due to these factors.

CONCLUDING REMARKS

This article has reviewed domestic producer prices and international prices for wheat, rice, cotton and sugarcane during the 1991-2008 period. The data and analysis indicate that domestic production of wheat and basmati rice (and sugarcane when import parity is used as a measure of its opportunity cost) has been subject to implicit taxation. At times, these crops enjoyed protection, which coincided with falling prices in world markets. Clearly, the degree of taxation and resource transfers from producers and surplus regions has varied from year to year. Nevertheless, as a result of these transfers, farmers' incomes and well being have been adversely affected. The production of coarse varieties of rice has been somewhat protected during most years in the reference period. In the case of cotton, domestic production was heavily taxed in the 1990s, but in recent years, its domestic prices have been tracking world prices rather closely, thus reducing the implicit taxation. In view of the burgeoning demand for cotton in Pakistan, the domestic textile industry needs to enhance its support for research and development efforts to raise its productivity and expand domestic production.

Given current levels of production and processing efficiency, the data suggest that Pakistan will be hard pressed to export sugar competitively. Nevertheless, if sugar prices in world markets rise persistently to the levels witnessed in the recent past, it may be economically feasible to expand domestic production to meet domestic requirements. However, it may still be difficult to compete in export markets. The sugar sector would be well served by research and development efforts aimed at improving the efficiency of sugarcane production and processing.

The role of the public sector and government interventions in commodity markets has declined over time while that of the private sector has expanded. Nevertheless, the food crises experienced in 2006-07 and 2007-08 have highlighted the shortcomings of Pakistan's current production, marketing, and distribution systems. Wheat marketing witnessed the return to some of the old administrative measures in 2007-08: restriction of commodity movements and compulsory government procurements. The end result of these interventions has been a consistently inadequate market infrastructure and a lot of waste and malpractice in the public

sector. Unless and until the fundamental imbalance between demand and supply is addressed, these interventions will only aggravate rather than solve the problem. It is imperative to arrest the historical resource transfers from farmers and remove other distortions to incentives if the crop sector is to be able to play its proper role in agricultural development and the alleviation of rural poverty. If the economic environment for agriculture is not improved, the requisite farm investments will not occur. To some extent, there has been an improvement in the economic environment for agriculture in Pakistan, as evidenced by steps taken by the government to increase producer incentives during the 2008-09 crop year. However, this is only half of the story. The other half relates to the development, dissemination, and adoption of productivity-enhancing techniques and technologies. These measures will assume greater importance as domestic markets are increasingly aligned with world markets.

Appendix Table 1. Area and Production of Crops Under Study in this Paper

Years	Wheat	Rice	Cotton	Sugarcane
Area: 000 hectares				
Average: 1991-95	8,059	2,099	2,758	927
Average: 1996-2000	8,307	2,334	3,002	1,030
Average: 2001-05	8,169	2,339	3,004	1,020
Average: 2006-08	8,480	2,572	3,077	1,059
Average: 1991-2008	8,221	2,302	2,944	1,002
Production: 000 tons				
Average: 1991-95	15,724	3,412	1,641	40,902
Average: 1996-2000	18,238	4,487	1,673	48,371
Average: 2001-05	19,509	4,607	1,900	48,873
Average: 2006-08	22,107	5,516	2,127	54,443
Average: 1991-2008	18,895	4,506	1,835	48,147

Source: Calculations by the author based on data from Pakistan Economic Survey (Statistical Supplement) 2007-08.

Appendix Table 2. Exports and Imports of Sugar in Pakistan

Year	Imports	Unit value of imports		Exports	Unit value of exports		Imports- Exports
	Metric tons	Rs / ton	$/ton	Metric tons	Rs/ ton	$/ton	Metric tons
1990-91	434,730	8,269	369	NA	NA	NA	434,730
1991-92	116,741	7,830	315	NA	NA	NA	116,741
1992-93	75,018	7,356	291	NA	NA	NA	75,018
1993-94	47,754	9,320	312	125,265	9,912	329	(77,511)
1994-95	4,998	13,149	426	462,145	11,936	387	(457,147)
1995-96	3,299	15,519	454	29,134	12,016	358	(25,835)
1996-97	722,273	13,651	352	NA	NA	NA	722,273
1997-98	110,407	15,186	373	321,063	13,757	318	(210,656)
1998-99	9,652	14,936	299	906,602	12,739	272	(896,950)

1999-00	66,125	11,473	221	30,487	16,032	310	35,638
2000-01	926,856	15,558	271	NA	NA	NA	926,856
2001-02	84,049	17,185	271	3,800	20,184	329	80,249
2002-03	7,749	17,991	309	32,230	13,750	235	(24,481)
2003-04	9,818	16,196	281	116,160	13,679	238	(106,342)
2004-05	265,784	19,615	330	54,410	18,782	316	211,374
2005-06	1,517,743	24,469	408	60,957	26,055	435	1,456,786
2006-07	585,754	26,817	444	NA	NA	NA	585,754
2007-08	23,617	23,415	386	239,130	22,067	347	(215,513)

Sources: Federal Bureau of Statistics and Pakistan Sugar Mills Association Annual Report (2007).
Note: Values in parentheses indicate net exports, while values without parentheses are net imports.
N/A: negligible quantities of import/exports or data not available.

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