HOUSEHOLD FOOD SECURITY IN PAKISTAN: THE RATION SHOP SYSTEM

HAROLD ALDERMAN
M. GHAFFAR CHAUDHRY
MARIO GARCIA

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HOUSEHOLD FOOD SECURITY IN PAKISTAN:
THE RATION SHOP SYSTEM

Harold Alderman
M. Ghaffar Chaudhry
Marito Garcia

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International Food Policy Research Institute
Washington, D.C.

Pakistan Institute of Development Economics
Islamabad, Pakistan
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FOREWORD

Studies of food subsidies are an important part of IFPRI’s research portfolio. Their primary purpose is to help governments of developing countries assess how current and alternative subsidy policies affect human nutrition, food consumption, income growth and distribution, fiscal costs, agricultural production, and foreign trade. Results from studies in several countries have been published as IFPRI’s research reports. This working paper series was initiated to meet requests for additional information on the nature, implementation, and effects of subsidies in various countries. The food subsidy papers complement IFPRI’s research reports on the subject by providing detailed descriptive analyses of operational and implementation issues and impact.

Many countries have instituted food subsidy schemes during times of high prices or shortages only to find that once begun such policies are difficult to end in spite of sharply rising fiscal costs to the government. Pakistan has subsidized part of the wheat flour consumed by households for many years through a ration system. In the mid-1980s, however, wheat flour was derationed and was replaced by a generalized price subsidy for wheat. This study examines the consequences of this policy change on the urban poor and on the entire grain-marketing system and evaluates the relevance of the ration shop system to the broader issues of alleviation of poverty and malnutrition.

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Shubh Kumar
Project Director
ACKNOWLEDGMENTS

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I. INTRODUCTION

Once established, government programs and the infrastructure that maintains them tend to continue with only occasional minor changes. Rationing and the partial provisioning of subsidized wheat flour in Pakistan--a program initiated before the majority of the present citizens of Pakistan were born--appears to conform to this generality.1 The economic environment in which such institutions function, however, is seldom static. Consequently, there is value in periodically re-assessing the appropriateness of the goals and administration of such a program to the contemporary environment.

Since the discontinuance of statutory rationing and the creation of the system of partial provisioning of flour, at least three such studies have been undertaken, at five-year intervals, beginning in 1972.2 The present study is likely to be the last; while the research reported here was under way, the Government of Pakistan announced the derationing of wheat flour. This study, then, has an element of history. It assesses the rationale for the government's decision. More than just confirming the appropriateness of such a policy, however, the report seeks to analyze the consequences of the new policy, both for the urban poor and for the grain-marketing system as a whole. Furthermore, the report includes a discussion of data collected in the ration shop evaluation that are relevant to the larger issues of nutrition policy and the alleviation of urban poverty regardless of the fate of the ration system.

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1 The ration system was established in 1942 to deal with wartime shortages. See Beatrice Rogers, "Pakistan's Ration System: The Distribution of Costs and Benefits," in Consumer-Oriented Food Subsidies: Costs, Benefits, and Policy Options for Developing Countries, ed. Per Pinstrup-Andersen (Baltimore, Md.: Johns Hopkins University Press for the International Food Policy Research Institute, forthcoming).

2. THE TWILIGHT OF THE RATION SYSTEM

THE WORKING OF THE RATION SYSTEM

Although the ration shop system in Pakistan was originally designed to meet the full requirements of households for such necessities as wheat, sugar, tea, matches, yarn, and cotton cloth, rationing of essentials other than wheat and sugar was discontinued in 1947 after independence had been achieved. During the 1960s, the statutory ration system was abolished in favor of partial provisioning. Under partial provisioning, the supply of subsidized flour as specified in a ration quota is typically less than the total amount of flour required by a household. To fulfill its total need for flour, the household is expected to purchase flour in the open market at prices higher than those of the ration shop. Sugar was derationed in August 1983.

Since the inception of partial provisioning, there has been considerable variation in the monthly quotas of wheat flour per head. During the early 1970s, the amount of wheat flour supplied per adult member of a household was 7.0 kilograms per month, and half that amount was supplied for children. From 1976 to 1980, the quota of wheat flour was increased to 7.5 kilograms per adult person a month but was reduced to 4.8 kilograms a month in 1982. More recent evidence indicates that quota restrictions were often inoperative in 1986. Most of the consumers who bought from the ration shops, irrespective of


4 Figures reported in Rogers, "Pakistan's Ration System"; and Riaz Ahmad Khan, Issues of Food Distribution in Pakistan, Staff Paper (Islamabad: Pakistan Agricultural Research Council, September 1982).

5 Peter A. Cornelisse and Syed Nawab Haider Naqvi, The Wheat Marketing Activity in Pakistan (Islamabad, Pakistan: Pakistan Institute of Development Economics; Rotterdam: Centre for Development Planning, 1987).
their response to quota restrictions, were able to purchase atta in excess of the amounts suggested by quota restrictions.\(^6\)

Depending on the availability of wheat from domestic sources, imports have been needed to fill the gap between requirements for releases to the ration system and supplies available in the market. Although the ration system was fed largely from imports of wheat until the late 1970s, near self-sufficiency in wheat during the 1980s has contributed significantly to the importance of domestic supplies to government stocks in recent years. The increasing dependence on domestic supplies has changed the nature of the government's elaborate system of wheat procurement. The system is now one of voluntary procurement, with direct purchases from farmers. This is in contrast to the wheat-procurement programs that were in effect during the 1950s and 1960s; these programs entailed compulsory procurement during the 1950s and purchases of wheat from market functionaries during the 1960s.

Administrative control of the ration system lay mainly with the provincial food departments, which were headed by the directors of food in the several provinces. They were assisted by controllers of food at the district level and by food inspectors at the subdistrict, or tehsil, level. Although the federal government seldom intervened in the day-to-day operations of the provincial food departments, it coordinated provincial activities, set prices at which wheat was procured, wheat was released to mills, and ration flour was sold, and was responsible for the management of wheat imports and their allocation among the provinces. The provincial food departments were responsible for procurement of wheat from the farmers, along with the Pakistan Agricultural Storage and Services Corporation (PASSCO), for releases of wheat to flour mills, for allocation of wheat flour to ration shops, and for the checking of fraudulent practices in the wheat and wheat flour trade. Annual wheat procurement targets were assigned by the Ministry of Food and Agriculture (MINFA) to the provincial food departments and PASSCO. To prevent overlap in procurement, MINFA provided guidelines with respect to areas of procurement of the food departments and PASSCO. Stocks held by PASSCO were normally earmarked for the deficit provinces of the North West Frontier Province (NWFP) and Baluchistan and Azad Jamma and Kashmir (AJK). As will be seen, the procurement and storage functions of MINFA and PASSCO have not been affected by derationing.

The wheat stocks acquired by procurement or import are kept in storage owned by the food departments or rented from other agencies in the public sector, particularly PASSCO. In 1986 the government had a wheat-storage capacity of more than 4.4 million metric tons, up from

\(^6\) Atta is whole meal flour. An alternative transliteration of the word from Urdu is aata; the spelling used here is that used by the Government of Pakistan.
nearly 2.0 million metric tons in 1980. Much of this capacity is poorly maintained. Stocks are held more for seasonal management of wheat marketing than for interyear buffer stocks.

Whenever it was desired, the provincial food departments released wheat to mills for transmission to ration shops and final consumers. The ration shops were privately owned but held licenses from the government to sell ration flour at regulated prices. They received flour from designated flour mills in accordance with the number of consumers registered with them. While the holder of a ration shop assumed full responsibility for transportation costs between the flour mill and his ration shop, he was allowed to add a prespecified transportation charge to the ration shop's sale price depending on the distance from the nearest flour mill to the ration shop. In order to qualify for purchases of wheat flour from a ration shop, a consumer customarily registered with a specific ration shop.

Although at one time the food departments were responsible for issuing ration cards, by the mid-1980s the cards were no longer needed to qualify for purchases of wheat flour from a ration shop. This policy, however, varied in different districts. Where shops did not require cards, recent migrants and seasonal workers could gain access. In general the ration shops sold little wheat flour in the rural areas, however; the system was biased in favor of urban consumers.

There can be no doubt that the deliberate interventionist policy of the government toward the wheat market was successful in ensuring low prices for urban consumers. While the costs and benefits of the rationing system will be discussed in subsequent sections, it may be pertinent to discuss costs at various levels of the wheat market in the course of time. Although the prices of wheat flour on the open market were considerably higher than ration shop prices from the late 1960s to the mid-1970s, retail prices of ration shop flour were practically the same as procurement prices and the prices at which wheat was issued to mills. In fact, between 1972/73 and 1974/75, both the issue price to mills and the ration price of flour were considerably lower than the procurement price of wheat. As the burden of the subsidy for wheat continued to mount, the policy was revised so that slightly higher prices were charged for ration flour beginning in 1975/76. As the burdens mounted further, however, the government was forced during the early 1980s to charge significantly higher prices for releases to mills and ration shops. There was a markup of Rs 10.00 per 100 kilograms of wheat.


8 Rogers and Levinson, Subsidized Food Consumption Systems in Low-Income Countries.

wheat, for example, between the procurement price and the issue price to mills and, again, between the issue price to mills and the ration shop price from 1981/82 to 1983/84. While the markup between the issue price to mills and ration shop price continued to prevail, the government's release price to mills fell below the procurement price by a margin of Rs 4.71 per 100 kilograms during the next period. It can, however, be observed that the price of wheat on the open market continues to be well above the ration shop prices during the 1980s.

**TOTAL EXPLICIT COSTS OF THE FLOUR SUBSIDY**

As indicated in Table 1, more than 36 billion rupees (at 1985 prices) have been spent on flour subsidies since fiscal year 1974.

Table 1--Explicit subsidies on wheat flour, 1974-86

<table>
<thead>
<tr>
<th>Year</th>
<th>Nominal Cost (Rs million)</th>
<th>Real Cost (1985 Rs)</th>
<th>As Percent of All Subsidies</th>
<th>As Percent of Current Expenditures</th>
<th>As Percent of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973/74</td>
<td>1,917</td>
<td>4,993</td>
<td>79.5</td>
<td>13.2</td>
<td>2.2</td>
</tr>
<tr>
<td>1974/75</td>
<td>2,119</td>
<td>4,828</td>
<td>66.6</td>
<td>10.8</td>
<td>1.9</td>
</tr>
<tr>
<td>1975/76</td>
<td>1,183</td>
<td>2,601</td>
<td>39.7</td>
<td>5.9</td>
<td>0.9</td>
</tr>
<tr>
<td>1976/77</td>
<td>1,092</td>
<td>2,424</td>
<td>45.0</td>
<td>5.4</td>
<td>0.7</td>
</tr>
<tr>
<td>1977/78</td>
<td>1,615</td>
<td>3,200</td>
<td>49.1</td>
<td>6.3</td>
<td>0.9</td>
</tr>
<tr>
<td>1978/79</td>
<td>2,513</td>
<td>3,994</td>
<td>41.7</td>
<td>8.2</td>
<td>1.6</td>
</tr>
<tr>
<td>1979/80</td>
<td>1,757</td>
<td>2,494</td>
<td>25.0</td>
<td>4.9</td>
<td>0.7</td>
</tr>
<tr>
<td>1980/81</td>
<td>1,052</td>
<td>1,333</td>
<td>19.6</td>
<td>2.6</td>
<td>0.4</td>
</tr>
<tr>
<td>1981/82</td>
<td>1,303</td>
<td>1,560</td>
<td>30.1</td>
<td>2.8</td>
<td>0.4</td>
</tr>
<tr>
<td>1982/83</td>
<td>1,122</td>
<td>1,265</td>
<td>23.5</td>
<td>1.9</td>
<td>0.3</td>
</tr>
<tr>
<td>1983/84</td>
<td>1,267</td>
<td>1,341</td>
<td>20.7</td>
<td>1.7</td>
<td>0.3</td>
</tr>
<tr>
<td>1984/85</td>
<td>2,641</td>
<td>2,641</td>
<td>30.7</td>
<td>3.1</td>
<td>0.6</td>
</tr>
<tr>
<td>1985/86</td>
<td>3,232</td>
<td>3,049</td>
<td>30.0</td>
<td>3.1</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Sources: Pakistan, Ministry of Finance, Pakistan Economic Survey, 1984-85 and 1985-86 (Islamabad: MOF, 1985 and 1986). Note that the costs reported in the two volumes differ in a few instances, particularly in 1975/76 and 1979/80. The more recent volume was used whenever there was a discrepancy. Figures include federal and provincial government subsidies. The costs for 1984/85 and 1985/86 came from unpublished data of the Ministry of Finance.

*a Provisional.*
With peaks in the expenditures in 1973/74, in 1978/79, and in recent years, there is no obvious trend in the real cost of the subsidy. Since there has been steady economic growth during these periods, however, the magnitude of the subsidy in relation to GDP was smaller during the 1984-86 peak than during the 1975-77 low. A similar pattern appears with subsidies as percentages of current government expenditures. The latter decline in the relative position of subsidies, which is also reflected in the proportion of total subsidies devoted to flour subsidies, reflects a number of developments in government policy. Subsidies on fertilizers, for example, exceeded flour subsidies between 1979 and 1984. During the mid-1980s the government began to phase out such input subsidies. During that period, however, subsidies on edible oils rose dramatically, preventing the flour subsidy from dominating total subsidies to the degree that it had in the mid-1970s.

The flour subsidy in 1984-86 came to roughly Rs 30 per capita a year (in July 1986, Rs 16.8 = US$1.00). While food subsidies of a much larger magnitude than were to be observed in Pakistan in the middle of the 1980s can contribute to inflation and also destabilize imports of machinery and raw materials, a compelling case that this has happened in Pakistan has not been made.10 In a similar vein, though low producer prices can lead to misallocation of resources and loss of potential production in the agriculture sector, there is not necessarily a direct link between consumer subsidies and low producer prices. Explicit food subsidies may separate producer and consumer prices and lead to a reduction in indirect taxation of agriculture. The subsidies may transfer support for consumers from wheat producers to the general treasury. Thus such subsidies may not be causally connected to agricultural disincentives.11 An evaluation of the partial provisioning of flour should not, then, be made on the basis of its effect on the macroeconomy or on producer incentives. Such an appraisal should instead be made on the basis of cost effectiveness and its ability to achieve the goals of a program.


The approach followed here is to identify the beneficiaries of the system and to consider ways of reducing expenses to free resources for other pressing needs without serious losses of welfare to the beneficiaries.

DETERMINATION OF UNIT COSTS OF FLOUR SUBSIDIES

The government figures of explicit subsidy on wheat are based on three principal considerations: the costs of the movement of grains from procurement centers and the port of Karachi to warehouses and storage, a subsidy on domestic supplies in recognition of differences in procurement prices and issue prices to mills, and a subsidy on imported wheat as a result of the difference in import costs and issue prices to mills. Although the incidentals between warehouses and mills and those between flour mills and ration shops are also relevant to the cost of flour, these are generally paid by the mill owners or the ration shop holders, to be recovered later through markups in prices. These are therefore not subsidies.

During 1985/86, the costs of transport within a given province and of storage accounted for roughly Rs 600 per ton. \(^{12}\) They consist of such charges as the cost of gunny bags, salaries, interest, and miscellaneous expenditures, including delivery charges, local—but not interregional—transportation, the costs of loading and unloading, supervision, market taxes, and fees and damages. Interest is the most important item in these costs, accounting for as much as 43 percent of total costs during 1985/86. Interest consists of both charges on working capital and long-term loans for construction of storage facilities. The cost of bags was responsible for another 27 percent. The remaining 30 percent was contributed, more or less equally, by warehouse expenses, such as fumigation (8.9 percent), salary and staff allowances (9.2 percent), and miscellaneous expenses (11.9 percent).

It costs an additional Rs 360 to transport grain from the Punjab to the NWFP. Similar interprovincial transport charges were not incurred by the Punjab, which is a grain-surplus region, or the Sind, which is roughly self-sufficient. \(^{13}\) No direct information is available for Baluchistan, but it can be assumed that transport charges are of an order of magnitude similar to that of transport to the NWFP.

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\(^{12}\) The costs vary by province and for reasons of accounting are also affected by the amount of procurement carried over to the following year. The figure of Rs 600, then, is only an indicator of costs expected in any given year. The figures here are based on discussions with officials of the Food Department and PASSCO.

\(^{13}\) Cornelisse and Naqvi, *The Anatomy of the Wheat Market*. 
In 1986 the issue price to mills (Rs 1,703 a ton) was considerably lower than landed import costs (Rs 2,450 per metric ton, an average for imports during July 1985-March 1986) and was close to procurement prices for the 1985 harvest (Rs 1,750 per metric ton). Therefore, the unit subsidy on imports (Rs 747 a ton) exceeded the unit subsidy on domestic supplies, net of storage and transport (Rs 47 a ton) by a considerable margin. 14 This finding is consistent with findings in other studies made in the southeast Asian region. 15

During 1985/86, total wheat releases were on the order of 3.1 million metric tons, including 1.38 million metric tons of wheat imports. Calculations here suggest that storage and transport contributed nearly 62 percent to unit subsidies on wheat, on the basis of the assumption that imported wheat is released to mills according to a set of priorities. While there are handling charges, therefore, no appreciable interest charges are incurred. Under this assumption, the subsidy on grain released to mills totals Rs 2.98 billion. 16

The foregoing information could be used to explain the steep rise in wheat subsidies after 1983/84, as reflected by the data in Table 1. Apart from some possible increases in storage costs, the noteworthy increase in wheat subsidy was largely the result of Pakistan's dependence on wheat imports and, to a lesser extent, rising procurement prices in relation to issue prices (see Table 2). While the issue prices until 1983/84 were kept higher than procurement prices and therefore reduced the subsidy costs, they were below the latter in 1984/85 and 1985/86.

While this study concentrates on the fiscal costs of explicit subsidies, it is useful to discuss briefly the relation of domestic procurement prices to the world price. In many years, the domestic

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14 Prices are from Pakistan, Ministry of Finance, Pakistan Economic Survey.


16 This assumes that each ton of imported wheat incurs a handling cost of Rs 342 plus a price subsidy of Rs 747, while domestically procured grain incurs a storage and handling cost of Rs 600 plus a price subsidy of Rs 47. In addition, 1 million tons transported to the NWFP or Baluchistan incur an additional cost of Rs 360 a ton. The remainder of the government subsidy bill can be assumed to accrue to the northern areas, Chitral and Azad Kashmir.
Table 2--Intervention prices of wheat, 1981/82 through 1985/86

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Government procurement price</td>
<td>1,450.0</td>
<td>1,600.0</td>
<td>1,600.0</td>
<td>1,750.0</td>
<td>1,750.0</td>
</tr>
<tr>
<td>Issue price to mills</td>
<td>1,567.4</td>
<td>1,702.9</td>
<td>1,702.9</td>
<td>1,702.9</td>
<td>1,702.9</td>
</tr>
<tr>
<td>Ration shop issue price</td>
<td>1,661.1</td>
<td>1,799.9</td>
<td>1,799.9</td>
<td>1,799.9</td>
<td>1,799.9</td>
</tr>
</tbody>
</table>


The price has been below the import parity price. The decline in international prices and increases in procurement prices in recent years together have narrowed this gap. Using a world price of US$148 a ton in 1981, for example, the import parity price of wheat was Rs 2,925 a ton, while a world price of US$100 a ton in 1986 translates to Rs 2,150 a ton, or roughly 7.5 percent above procurement. Since Pakistan is close to a point of self-sufficiency and occasionally exports, however, it is worthwhile to compare procurement prices with export parity prices. These were Rs 1,900 a ton in 1981 and Rs 1,125 a ton in 1986. Since domestic prices between export and import parity are compatible with free trade, while prices that exceed import parity imply protection, there are grounds for debate whether present concern for implicit taxation of wheat producers may perhaps be overstated. This issue depends critically on an understanding of distortions in the exchange rate, and interplay with more obviously taxed crops should be considered, as well as input costs, so it is beyond the scope of the current study. It is, however, important to note that the foregoing statement that explicit subsidies increased during those years when imports were required does not imply a statement that import parity is the optimal level for domestic procurement prices.


18 Calculated using shipping and handling costs of US$35 a ton and an exchange rate of Rs 16. Note that to the degree that exchange rates are overvalued, these costs are underestimates.
PRESENT AND PAST PATTERNS OF PURCHASE OF SUBSIDIZED FLOUR

While the various studies that indicate the extent of use of rationed flour at numerous points during the last decade differ in their sample frames or the way they report data, taken together they depict patterns and trends in the subsidy system. As indicated in Table 3, there has been a marked decline in the number of households that rely on ration shops. The studies undertaken in the 1970s indicate that the majority of the urban population obtained ration flour during that period. These purchases had dropped significantly by 1986. In part this may reflect the derationing of sugar. It is likely that many families discontinued purchasing rationed flour when they no longer had to visit the depot to obtain sugar. A survey by the Pakistan Institute of Development Economics (PIDE) and the University of Rotterdam, undertaken before the derationing of sugar, however, indicates that the decline in the purchase of rationed flour in urban areas began even before the change in sugar policy. While the rural population had never relied on the ration system to the degree that the urban population had, there was a similar decline in use during the period illustrated.

Other research undertaken by the International Food Policy Research Institute (IFPRI) in five districts of Pakistan—Attock, Badin, Dir, Faisalabad, and Kalat—reported a rural rate of ration-shop use in August 1986 of 4.6 percent. This varied among the several districts; no depots were reported in Badin, while 14 percent of the families in Dir obtained ration flour during the two months following the wheat harvest.

To a large degree, this urban-rural distinction stems from differences in availability; ration depots have never been as prevalent in rural areas as in urban. The disparity was most pronounced in the final year of the system. Note, however, that rates of use, conditional on availability, did not differ markedly between the two

19 The figures reported for the 1986 studies pertain to use during the month preceding the survey. In a survey for this study by the International Food Policy Research Institute (IFPRI) and the Pakistan Institute for Development Economics (PIDE), an additional 5 percent of households reported that they used the ration at some time during the year, although they did not use it the previous month. In the IFPRI-Gallup survey, 6 percent reported they had made a purchase during the last six months, although not in the previous month, and another 6 percent had made a purchase a year earlier.

20 While the Micro-Nutrient Survey indicated that 82 percent of rural families reported that there were ration shops fairly close to their villages, only 16 percent indicated that flour was available in such shops (Pakistan Planning Division, Micro-Nutrient Survey of Pakistan [Islamabad: Pakistan Planning Division, 1978]).
Table 3--Patterns in purchase of subsidized flour

<table>
<thead>
<tr>
<th>Study/Scope</th>
<th>Date</th>
<th>Families Reporting Subsidized Flour Available</th>
<th>Percent of Total Families Purchasing Wheat and Rationed Flour</th>
<th>Percent of Total Families Purchasing Wheat from Sample Shop</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFPRI-PIDE</td>
<td>April-August 1986</td>
<td>71</td>
<td>27 (38)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>22</td>
<td>998</td>
</tr>
<tr>
<td>IFPRI-Gallup</td>
<td>April 1986</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>21</td>
</tr>
<tr>
<td>IFPRI-Gallup</td>
<td>January 1986</td>
<td>76</td>
<td>19 (25)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>31</td>
<td>822</td>
</tr>
<tr>
<td>PIDE-Rotterdam</td>
<td>June 1982</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>4</td>
</tr>
<tr>
<td>PARC (Rawalpindi)</td>
<td>August 1981</td>
<td>100</td>
<td>63</td>
<td>43</td>
<td>1,685</td>
</tr>
<tr>
<td>Gallup</td>
<td>October 1979</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>722</td>
</tr>
<tr>
<td>Micronutrient Study (nationwide)</td>
<td>1977</td>
<td>93</td>
<td>70 (75)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>50</td>
<td>473</td>
</tr>
<tr>
<td>Roti Study (Karachi)</td>
<td>1974</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>1,475</td>
</tr>
<tr>
<td>Roti Study (Lahore)</td>
<td>1974</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>1,000</td>
</tr>
</tbody>
</table>

Sources: International Food Policy Research Institute and Pakistan Institute of Development Economics, "Wheat Flour Subsidy Survey, 1986," IFPRI, Washington, D.C., 1986 (computer data). The IFPRI-Gallup reports are from unpublished data of the Pakistan Institute for Public Opinion, Islamabad. The PIDE-Rotterdam data are reported in Peter Cornelisse and Syed Naqvi, "The Anatomy of the Wheat Market in Pakistan" (Islamabad: Pakistan Institute of Development Economics and Rotterdam: Centre for Development Planning, 1984). The Pakistan Agricultural Research Council (PARC) study is reported in Riaz Ahmed Khan, Issues of Food Distribution in Pakistan, Staff Paper (Islamabad: PARC, September 1982). The Micro-Nutrient Study data are a reworking of the Micro-Nutrient Survey of Pakistan, details of which are reported in Pakistan Planning Division, Micro-Nutrient Survey of Pakistan (Islamabad: Pakistan Planning Division, 1978); and in Beatrice Rogers et al., Consumer Food Price Subsidies (Cambridge, Mass.: Oelgeschlager, Gunn and Hain, 1981), vol. 4, Study V of Nutrition intervention in Developing Countries. The Roti study was undertaken by Nasiruddin Associates Ltd. It is cited in Riaz Khan, Issues of Food Distribution in Pakistan.

<sup>a</sup> Rate of use is conditional on availability.
sectors; when subsidized flour was available, rural residents purchased it. Furthermore, despite the low incidence of shops selling subsidized flour in rural areas in 1986, since there are far more rural residents than urban, the absolute numbers of families that obtained subsidized flour were in 1986 more nearly the same than were the rates of use.

REGIONAL PATTERNS

The availability of ration depots as reported by urban consumers was greatest in the Punjab and lowest in the North West Frontier Province (NWFP) in January 1986. In the NWFP, slightly more than half of urban households reported that a ration shop was available. For those who had a shop nearby, however, use was lowest in the Punjab and highest in the NWFP and Baluchistan. This was also true in 1979. The 1982 and 1976 studies are consistent with the other two studies in reporting the lowest use in the Punjab, but they report greater use in the Sind than in the NWFP. Both the 1986 and 1982 studies indicate particularly low use in Lahore, which influences the Punjab average.

The two rural surveys undertaken by Gallup Pakistan indicate a greater use of the ration in the NWFP and Baluchistan than elsewhere. In the PIDE-Rotterdam study, however, it was found that more purchases were made in rural Punjab. This minor discrepancy comes mainly from the greater availability observed in the NWFP by Gallup Pakistan than that observed in the PIDE-Rotterdam study, rather than from significant differences in the data from the Punjab.

In addition to the pattern of distribution of ration flour, it is necessary to consider the provision of subsidized flour to bakeries in the NWFP. This provision—generally neglected in discussions of the ration system—amounted to approximately 120,000 tons in 1986, or roughly 15 percent of the total amount of grain released by the government in that province. Of this, 66 percent was provided on quota to bakeries in urban Peshawar, 11 percent to other urban areas, and 23 percent to rural towns.

PATTERNS, BY INCOME GROUP

One of the features of the Pakistan flour subsidy system is the degree to which it was self-targeting. As incomes increased, families became less likely to purchase flour at the ration depot, relying instead on the open market. This observation, which is an essential

21 Unpublished data, Food Department, Provincial Government of the NWFP.

22 Rogers and Levinson, Subsidized Food Consumption Systems in Low-Income Countries.
element of a cost-effective system, is borne out by all the available studies of ration use. As indicated in Table 4, both urban studies undertaken in 1986 indicate a pronounced decline in the use of ration shops with an increase in total expenditures or income. This pattern will subsequently be analyzed in greater detail. The 1981 Rawalpindi study showed a similarly greater use by low-income households. In this study households with incomes of less than Rs 500 (1981 prices) per household a month were found to purchase from the ration depot 65 percent of the total flour that they consumed. This declined to 59 percent in the Rs 500-750 income bracket and steadily thereafter, so that the Rs 1,500-3,000 income bracket obtained only a third of their atta from the ration shop. The data from Lahore and Karachi from 1974 show a pattern of declining consumption of rationed flour with increasing income—essentially the same as in the Rawalpindi study.

The 1982 PIDE-Rotterdam study indicated that urban households in the Sind and the NWFP with Rs 50-150 per capita a month purchased nearly half their flour from the depot, while those in the higher brackets bought only 15 percent there. In the Punjab the corresponding figures are 37 percent and 15 percent. This study, as well as the MNS

Table 4--Percentage of families purchasing subsidized flour, by income group

<table>
<thead>
<tr>
<th></th>
<th>Expenditures</th>
<th></th>
<th></th>
<th></th>
<th>Greater than 400</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Less than 100</td>
<td>100-150</td>
<td>150-250</td>
<td>250-400</td>
</tr>
<tr>
<td>Survey</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(1986 Rs/capita/month)</td>
</tr>
<tr>
<td>IFPRI-PIDE Micro-Nutrient Survey (urban)</td>
<td>50</td>
<td>41</td>
<td>31</td>
<td>29</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Household Income</td>
</tr>
<tr>
<td>Survey</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Greater than 2,000</td>
</tr>
<tr>
<td>IFPRI-Gallup (urban)</td>
<td>32</td>
<td>26</td>
<td>16</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

data, indicates that the lowest income or expenditure group--less than Rs 50 per capita a month in the PIDE-Rotterdam study--used the ration shop less than other groups. This may be the result of limited access or of inability to afford the bimonthly ration at a single purchase. Only a few observations are available for these very low-income groups, however.

The decline in ration use with increases in income is also observed in rural areas. In April 1986, for example, 35 percent of the rural households with monthly incomes of less than Rs 500 to whom a ration depot was available reported using such a shop. This declined to 20 percent in the highest income decile, a finding that reconfirms an earlier finding of the PIDE-Rotterdam study.

Although there is a widespread belief that white-collar workers rather than manual laborers were the principal users of the ration system, there is no evidence to support such a belief. In the IFPRI-PIDE study the place of employment for all household members was determined, and it was possible to test a related hypothesis that government employees use the ration system more than other individuals. There proved to be no difference between its use by employees in the public and private sectors.

NUMBER OF OUTLETS

Rogers reports that in 1977 the government's policy was to have one licensed ration shop per 3,000-6,000 persons.23 At that time, however, the number of persons per shop was between 1,300 and 1,900, depending on the province and sector. Cornelisse and Naqvi reported the number of families per shop at between 434 (in the Sind) and 546 (in the NWFP). This is roughly 2,500-3,500 persons per shop.

While the number of depots reported in Table 5 appears to reflect relative population between provinces and between years, the increase in the number of outlets is not in keeping with the decline in use. According to the households surveyed in the Micronutrient Survey, 7 percent of the urban depots and 80 percent of the rural depots handled only rationed sugar. Since sugar was derationed in 1983, the majority of the depots had no rationale in 1986. Nevertheless, this is not reflected in the registry of shops.

Turvey and Cook report a disparity between the number of registered households and the population in some cities in Pakistan, implying that this reflects illegal activity on the part of cardholders.24

23 Rogers, "Pakistan's Ration System."

24 Turvey and Cook, "Government Procurement and Price Support of Agricultural Commodities."
Table 5—Number of ration depots, 1977 and 1985

<table>
<thead>
<tr>
<th>Province</th>
<th>Total Number of Depots</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1977</td>
</tr>
<tr>
<td>Punjab</td>
<td>22,563</td>
</tr>
<tr>
<td>Sind</td>
<td>9,104</td>
</tr>
<tr>
<td>North West Frontier Province (NWFP)</td>
<td>4,732</td>
</tr>
<tr>
<td>Baluchistan</td>
<td>n.a.</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>36,399</strong></td>
</tr>
</tbody>
</table>


While this may have occurred, such inflated rolls may be a reflection of activities of shop owners or food inspectors. The apparent inflation of the number of active shops cannot be attributed to cardholders. The food departments in the provinces were apparently unable, or unwilling, to update the active list of depots following reorientation of the ration shops implied by derationing of sugar.

**RETAIL FLOUR PRICES**

If the difference between subsidized prices and other prices for flour has changed in the course of time, this might explain the changes in the use of rationed flour. The data in Table 6 indicate that there is no clear trend in the ratio of open-market to rationed flour. This is consistent with the absence of a strong pattern in subsidy costs, as seen in Table 1. The price of market flour during the interharvest period in relation to the subsidized price has been as high in recent years as it was in 1977, when ration purchases were far greater. In a similar vein, the 1979 Gallup survey does not indicate an increase in the use of ration flour, although the price differential was at its peak in that year. There is no clear evidence, then, that the ration has phased itself out through pricing policies. This is somewhat puzzling for, as will be seen, there is evidence that consumers shift between types of flour according to prices.
## Table 6--Market prices of flour in relation to subsidized prices and wages, 1976-86

<table>
<thead>
<tr>
<th>Month and Year</th>
<th>Karachi</th>
<th>Lahore</th>
<th>Faisalabad</th>
<th>Peshawar</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>February</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1986</td>
<td>1.59</td>
<td>1.47</td>
<td>1.51</td>
<td>1.55</td>
</tr>
<tr>
<td>1985</td>
<td>1.59</td>
<td>1.32</td>
<td>1.45</td>
<td>1.30</td>
</tr>
<tr>
<td>1984&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.50</td>
<td>1.17</td>
<td>1.27</td>
<td>1.25</td>
</tr>
<tr>
<td>1983&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.51</td>
<td>1.24</td>
<td>1.27</td>
<td>1.28</td>
</tr>
<tr>
<td>1982</td>
<td>1.52</td>
<td>1.21</td>
<td>1.20</td>
<td>1.26</td>
</tr>
<tr>
<td>1981</td>
<td>1.67</td>
<td>1.39</td>
<td>1.30</td>
<td>1.28</td>
</tr>
<tr>
<td>1980</td>
<td>1.86</td>
<td>1.54</td>
<td>1.40</td>
<td>1.43</td>
</tr>
<tr>
<td>1979</td>
<td>2.06</td>
<td>1.95</td>
<td>1.70</td>
<td>1.87</td>
</tr>
<tr>
<td>1978</td>
<td>1.86</td>
<td>1.51</td>
<td>1.88</td>
<td>1.83</td>
</tr>
<tr>
<td>1977</td>
<td>1.66</td>
<td>1.30</td>
<td>1.36</td>
<td>1.40</td>
</tr>
<tr>
<td>1976</td>
<td>1.50</td>
<td>1.21</td>
<td>1.38</td>
<td>1.36</td>
</tr>
</tbody>
</table>

| February      |         |        |            |          |
| Kilos of Flour Purchased with Daily Wage of Unskilled Laborer |
| 1986          | 12.38   | 14.65  | 10.11      | 8.93     |
| 1985          | 11.58   | 14.96  | 10.50      | 10.42    |
| 1984<sup>a</sup> | 12.41   | 16.14  | n.a.       | 11.11    |
| 1983<sup>a</sup> | 11.56   | 15.01  | 12.97      | 11.15    |
| 1982          | 10.71   | 14.33  | 12.50      | 10.00    |
| 1980          | 12.22   | 11.59  | 9.12       | 9.68     |
| 1979          | 13.75   | 9.89   | 9.37       | 8.43     |
| 1978          | 13.89   | 12.68  | 7.98       | 9.09     |
| 1977          | 12.42   | 13.85  | 11.72      | 8.85     |
| 1976          | 10.95   | 13.97  | 11.25      | 8.47     |


<sup>a</sup> January.
Table 6 also indicates the amount of flour that can be purchased with the daily wages of an unskilled laborer in construction work. While such a laborer may be better paid than many workers in the service and informal sectors, the earnings of such a worker as reflected in purchases of flour can still be used as an indicator of whether changes in wages for the poor accompany general growth in GDP and account for changes in the use of subsidized flour. While there are no strong trends throughout the period, there is an overall drift in three of the four urban centers. Although not illustrated, a similar drift can be observed for Multan and Rawalpindi. In the absence of a time series on income distribution, which may be available with a comparison of the national expenditure surveys, these data can be construed as rough indicators that changes in income may have contributed to the decline in urban use of subsidized flour. It is unlikely, however, that these mixed wage trends would be the sole, or even the main, cause of the observed change in patterns of flour purchases. With no significant secular trend in relative flour prices or in wages, changes in the administration and operation of the flour ration, including the derationing of sugar, as well as changes in attitudes toward the flour ration, are more likely candidates to explain the pattern in Table 3.

CONSUMER ATTITUDES

It is often stated that the decline in the use of rationed atta during the 1980s can be attributed to a decline in quality. This, however, is hard to test. As early as 1974, the majority of respondent households in the Roti study claimed that the rationed flour was of low quality. Similarly, 79 percent of the households interviewed by Khan in Rawalpindi claimed that the rationed atta was of a poor quality, yet rates of use were still high. The claim that the flour is substandard, then, may be similar to the complaint of the average boarding school or college student that the food in the cafeteria is inedible; such a complaint is almost obligatory and hard to correlate with behavior. While it is clear from the pattern of consumption by income level that the flour is an inferior good, it is less clear that a decline in quality has occurred with the passage of time.

Despite the low rate of use in 1986, 56 percent of the urban households surveyed by Gallup stated that they felt the system should continue. This is the same percentage of both rural and urban populations that held this opinion in 1979. In that year, however, the

25 Only for Karachi is the average since 1981 lower, by 7 percent, than the average for the previous five years.

26 Cited in Rogers and Levinson, Subsidized Food Consumption Systems in Low-Income Countries.

27 Khan, Issues of Food Distribution in Pakistan.
questi on pertained to the entire system comprising distribution of both sugar and atta.

THE NEED FOR REFORM OF THE RATION SYSTEM

The rates of use of the ration shops reported in the 1986 household surveys can be used to obtain an estimate of national consumption. The two IFPRI-Gallup surveys and the IFPRI-PIDE low-income survey are consistent with an estimate of 1.35 million households—or approximately 9 million people—receiving rations. The nationwide surveys, however, were undertaken during the preharvest months. As will be seen, there is evidence that use of the ration declines after the harvest. After an adjustment for this seasonal pattern, the estimate of households obtaining subsidized flour in any given month can be assumed to range between 1.20 and 1.35 million households.

The IFPRI-PIDE study of low-income neighborhoods found average purchases per purchasing family to be 60 kilograms a month. This is consistent with the ranges indicated in the IFPRI-Gallup study. The IFPRI-Gallup rural survey, which reports consumption within a few ranges of consumption categories, indicates that half the purchasing households bought less than 30 kilograms a month, while an equal number bought more than that. For a low estimate, 25 kilograms a month is taken as the average, and for a high estimate, 35 kilograms a month. While there is a wider range of uncertainty than is generally used for planning, it is important to note, as will be demonstrated, that the policy considerations in this section are not appreciably affected by any plausible or justifiable variations in the estimates of household consumption available.

Taking the lower estimates of use per rural household and the number of households using the system gives an annual national consumption of 713,000 tons. Using the upper estimates of both numbers of families and purchases per household gives an upper estimate of 828,000 tons. This is somewhat less than the estimates for 1982/83 of 1.1 million tons established by Cornelisse and Naqvi—1.21 projected to 1985/86, using population growth of 3 percent. Both the IFPRI-PIDE and the independent IFPRI-Gallup surveys, however, indicate a decline in ration use since 1982. An additional 120,000 tons is accounted for by the releases to bakeries in the NWFP.

These estimates are difficult to reconcile with national figures. Data from MINFA show that 3.1 million tons were released to mills for

28 This is 0.87 million urban households x 60 kilos x 12 months plus 0.48 million rural households x 35 kilos x 12 months.
distribution to the ration system in 1985/86. This figure excludes distribution in Azad Kashmir and the Northern Areas or to the military. Similarly, the figure is not said to include open-market operations conducted by the government. These other distribution channels handled about 0.6 million tons during 1985/86.

Since there is a serious discrepancy between consumption as reported by households and the releases to the mills, before discussing its implication, it is worthwhile to reconsider the data. Is it possible that the government's figures for releases to mills are overestimates? Some verification comes from the Finance Division's estimates of costs per flour subsidy reported in Table 1. As noted earlier, the percent subsidy on imports and domestically procured wheat multiplied by the tonnage released verifies the consistency of data on fiscal and physical quantities. Any downward revision in the number of tons subsidized, without a corresponding revision in the Finance Division's reported explicit costs of the subsidy, would therefore elevate the already high costs per kilo.

How likely is it, then, that the discrepancy between data on releases to mills and data on household consumption comes from an underestimate of household consumption? As discussed earlier, the independent 1986 urban samples are consistent. Furthermore, the decline since 1982 is a plausible reaction to the derationing of sugar as well as a continuation of the trend since 1977.

While each of the surveys reported uses a sample that is much smaller than that used for nationwide household expenditure surveys, the difference between the household data and aggregate releases is not explained by plausible sampling error. The urban sample for the IFPRI-Gallup survey, for example, is sufficient to the extent that there is a 95 percent probability that the true national urban rate of use is 19 percent ± 2 percent. An increase in the number of urban households using the ration system by 2 percent of the urban population would add roughly 60,000 tons to the total. Because of the large population but smaller purchases, a similar increase in the rural rate of use would

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29 Cornelisse and Naqvi report 2.4 million tons released to mills in 1982/83.

30 Clearly, if the rates of use for subsamples are desired, say, by district or occupation group within the urban population, the confidence interval would be wider than the nationwide interval. The need for such disaggregation is an important justification for the larger surveys undertaken by the Federal Bureau of Statistics. Those goals differ from the purpose of the surveys reported here.
add more than 80,000 tons to the estimate.\(^{31}\) Since the urban and rural samples are independent, however, any sampling errors are also independent, and the probability that such errors are of the same magnitude and sign simultaneously is a fraction of the probability that either is an underestimate. Since the rate of use is based on a simple yes-or-no question—"Did you purchase atta from the ration depot last month?"—administered in the local language, there is no reason to anticipate a bias caused by nonsampling error.

The mean consumption of subsidized flour calculated for households that consume ration flour is 60.0 ± 0.15 kilos per month. The confidence interval, then, is narrow. While a number of government officials have speculated that low-income households consume far more flour than has been reported in the IFPRI surveys, budget and calorie shares to flour, as well as total calories for households in the IFPRI-PIDE study, give no indication that total--subsidized and unsubsidized--flour is underreported. The quantities and budget shares, moreover, are similar to those reported in the 1979 and 1982 urban household expenditure surveys. The ration shop users in the IFPRI sample, for example, consumed 10.03 kilos of wheat and flour per capita a month (79 percent from the ration shop) while the figure for the entire urban population in 1979 was 9.55 kilos.\(^{32}\) The poorest 5 percent of the urban population consumed 9.86 kilos in 1979. Similarly, the amount per ration user in 1986 is close to the amount per user in 1977; the main difference is in the number of users.

Two other pieces of information also support the level of consumption observed in the IFPRI survey. First, if it is assumed that 10 percent of the 1986 wheat harvest went for seed or was damaged, the 13.9-million-ton harvest provided 10.5 kilos per capita a month. Considering that government stocks increased during the cropping year and that generally rural wheat consumption exceeds urban, this availability is consistent with the household behavior observed. Another indication that the survey data are unlikely to be an underestimate of the quantity purchased by those who use the system is that average consumption per person is in excess of the former quota for rationed flour.

A portion of the subsidized flour was not distributed in bulk through ration depots, but in 18-kilo bags sold in Friday markets as well as in ration shops. If all flour purchased at prices reported in the IFPRI-PIDE survey as less than Rs 2.15 a kilo is considered to be subsidized flour, the estimate of annual household consumption of

\(^{31}\) Clearly, there are rates of use that could be reconciled with aggregate figures, but no household survey evidence exists to justify using such rates.

\(^{32}\) The IFPRI sample will be discussed in greater detail in the following chapter. These figures exclude nan and other breads baked outside the home.
subsidized flour is raised to 930,000 tons, or 1,050,000, if bakeries are included.33

The data, then, imply that between 64 and 72 percent of the wheat released to mills was not drawn by consumers in the form of subsidized flour from ration depots or fair price shops. Just before the derationing of sugar, this figure was 55 percent.34 The system appears to be supplied at rates consistent with the number of urban ration shop cardholders that there were in 1977 before rates of use dropped. It is clear that there is a great deal of leakage, although it is not clear whether the leakage occurs at the wholesale level—that is, at or before the distribution to the mills—or at the retail, or shop, level. While a strict audit, preferably backed by the power of the judiciary, as opposed to one or more sample surveys, might have uncovered more information regarding who is profiting from such leakage, the problem seems institutional; it will require a reform of rules of the system rather than the replacement of some of the individuals who operate the present system to improve the delivery.

DERATIONING OF FLOUR

On February 9, 1987, the government announced that the ration system would be discontinued April 15, 1987. In lieu of the partial provisioning system under which some wheat was released for mills at Rs 1,703 a ton and some wheat sold at Rs 2,600 in open-market operations, the government announced plans to release unlimited quantities of wheat at Rs 2,000 a ton. No restrictions on movement of this grain would be in effect. The government also announced plans to raise the salaries of government employees drawing up to Rs 1,500 per month by Rs 20 as compensation for the expected change in flour prices. No changes in the provisioning of wheat in Chitral, the Northern Areas, or Azad Kashmir were envisioned.

In order that market prices of flour would begin to fall before the derationing, sales of wheat at Rs 2,000 a ton began in mid-March. Similarly, wages of government employees were increased on April 1. In the period between the announcement of the derationing and the implementation, the main public protest came from holders of ration shops, whose numbers were variously reported in the press as high as 110,000.35 These shopkeepers claimed that the new policy would render

33 This assumption is biased toward finding subsidized flour, for the truncation does not allow recording errors to be symmetrically distributed.

34 Calculated from data in Cornelisse and Naqvi, *The Anatomy of the Wheat Market*.

them jobless, although the government contended that they could function as fair-price shops, selling atta with a low markup above the release price, plus milling and transportation. At the time derationing was announced, the government estimated that the cost of this flour would be Rs 2.15. The government also expected that the Utility Stores Corporation would market atta with a low markup. These retail cost estimates were announced on the basis of a release price of Rs 2.00 a kilo. Subsequently the government recognized the potential for released grain to find its way back into procurement. In lieu of raising prices above the announced price, the government instituted an additional charge of Rs 8.00 for each 100-kilo bag.

The market price of atta was roughly 10-15 percent lower on the date of derationing than it had been at the time the policy change was announced. This, of course, moderated criticism. In Peshawar, however, the price of bread initially rose 25 percent, from 60 paisa per 215-gram loaf to 75 paisa. This increase followed from the increase in the price of an 85-kilogram bag of flour from Rs 154.8 to Rs 185.0. This price, however, still entails a subsidy on interprovincial transport as well as storage and handling costs. If it is assumed that the weight of a loaf is about 30 percent moisture, after derationing a bag of flour produced about Rs 423 worth of bread, instead of Rs 339 worth. The increase in bread prices, then, was greater than the increase in the cost of flour.36

It is important to note that this system will still entail a significant subsidy. While the combination of subsidies of Rs 900 per ton on rationed flour and no subsidies on open-market operations would cost Rs 3.20 billion for 1987/88, the general subsidy of Rs 520 a ton, net of the sale price of bags, on all flour would cost Rs 2.14 billion. Adding to this the increase of Rs 72 million in the wages of government employees linked to derationing, the total saving expected for 1987-88 is Rs 988 million. This implies a decrease of 31 percent in the subsidy bill.37 While this, of course, is not inconsequential, it may be less than advocates of derationing expected. Interprovincial transport will add another Rs 0.35 billion to the cost, moreover, leaving a net saving of only 20 percent of the initial estimates of the ration subsidy bill. An additional justification for derationing, however, is that it transforms the subsidy from unauthorized rents or benefits

36 Even under the assumption that a loaf is 20 percent moisture, the increase in bread prices was twice the increase in the cost of the flour input.

37 Minor adjustments to this figure can be made by applying income and price elasticities as well as alternative estimates of storage costs. Such fine tunings will be discussed later but do not affect the general implications. More serious potential consequences may result from changes in the marketing of grains by farmers. This will also be discussed elsewhere.
accruing to upstream administrators and mill owners to a general consumer surplus.

This was achieved, however, at the cost of a loss of benefits by those families, chiefly low-income, who did use the system. Some discussion of that loss and its implications will follow. The new system entails a storage subsidy, moreover, as well as some significant administrative features that may have unwelcome economic implications. These will be discussed in the concluding chapter.
3. THE SUBSIDY AS INCOME TRANSFER: WHO BENEFITED?

IMPORTANCE OF EXPENDITURES FOR FLOUR IN CONSUMER BUDGETS

The data presented in the preceding chapter point out a dilemma: the subsidy on wheat flour is both expensive and wasteful, yet at the same time, a relatively large proportion of low-income urban households obtained part or all their flour supplies from the ration or fair-price shops. The challenge, then, is to explore means by which these families can maintain their level of benefits or be compensated with alternatives while the overall costs of the subsidy are reduced.

As a first step, IFPRI and PIDE conducted an in-depth study of residents of low-income urban neighborhoods between April and August 1986. The sample of 1,000 households was selected through two-stage sampling. First, 25 low-income neighborhoods were selected. Subsequently, a random draw of residents within these neighborhoods was obtained using a list of all the households within the neighborhood. Half the selected households in each census were interviewed before Ramazan, which, since it was in May, roughly coincided with the wheat harvest. The survey was resumed a month after the month of Ramazan. Some perspective on seasonal use of ration flour was thus obtained without including the special consumption during the fast month in the recall period. This concentration on low-income households was designed to complement the nationwide unstratified survey undertaken with Gallup-Pakistan using an independently selected sample, also derived from the Federal Bureau of Statistics sample frame. This nationwide survey was initiated to obtain a rapid appraisal of current consumption for initial discussions with MINFA and to provide a point of reference for assessing the results of the study of low-income neighborhoods.

Ration shop use, by expenditure group, from these surveys was presented earlier, in Table 4. While the reported availability of ration depots in the sample of low-income neighborhoods was comparable to the nationwide survey, rates of use exceed the national urban average. This is in keeping with their lower average incomes. It was also observed that the number of households that reported using the

38 The neighborhood selection was obtained through the kind assistance of the Pakistan Federal Bureau of Statistics, using their stratification of census tracts. These tracts are classified according to housing, roads, electricity, and other indirect indicators of the incomes of the inhabitants.
ration shop during the previous month was smaller in the postharvest season than in the preharvest month. In the April round, 31 percent of the sample reported using the depot, while only 23 percent reported using it in the second round. When the shop was visited, however, the average number of kilos purchased did not differ appreciably between the two periods.

While the label "ration depot" is used in this report and in the IFPRI-PIDE survey questionnaire in conformity with conventional phrasing, in actuality, the official designation of the current program is partial provisioning of subsidized flour. As mentioned earlier, under partial provisioning, a legal free market is not only permitted, but it is also expected that many households will obtain a portion of their requirements in the higher-priced open market. This distinction conforms with the observed administration of the system. Only 56 percent of the households who visited the ration shop reported that a ration card was required, while only 7 percent of those who did not use the shop stated that not having a card was the reason for their purchasing elsewhere.

Furthermore, as indicated in Table 7, the majority of the ration shop users claimed that they were able to buy all the subsidized flour they required. This implies that either there was no quota on the amount that could be purchased or that the quota was not binding, given the household’s desired level of purchases. The authority to waive quotas apparently lies at the division level or even at the district level. Furthermore, shopkeepers may choose to ignore quotas even if they are regulated. There remains the possibility that quotas reflect

<table>
<thead>
<tr>
<th>Was Ration Adequate?</th>
<th>Able to Obtain All the Flour Required? (percent of answers)</th>
<th>Ration Obtained (kilos/capita/month)</th>
<th>Percent of Households Purchasing Other Flour</th>
<th>Quantity of Other Flour (if Purchased) (kilos/capita/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>62</td>
<td>9.14 (0.34)a</td>
<td>23</td>
<td>4.04 (0.45)a</td>
</tr>
<tr>
<td>No</td>
<td>38</td>
<td>6.05 (0.34)a</td>
<td>78</td>
<td>4.64 (0.31)a</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>7.97 (0.26)a</td>
<td>44</td>
<td>4.44 (0.26)a</td>
</tr>
</tbody>
</table>


a The standard deviation of the mean is in parentheses.
household preferences, however, since the opinion that the ration meets a household's requirements depends, in part, on what a household defines as required. A regression to determine what influences the probability that a household reports a quota on purchases indicates no statistical relationship with income. The only variable that was statistically significant at a 5 percent level—in a two-tailed test—was household size, which confirms that larger families are less likely to meet their requirements at the ration shop.39

For the remaining analysis, the assumption that the quotas on purchase are exogenous to the household is justified—that is, the factors that determine whether the ration is sufficient are largely outside the immediate control of the household.

The interpretation that a household's reporting that the subsidized flour was insufficient represents a real constraint or quota is also supported by the statistically significant differences in the average amounts of flour purchased by the two groups, as shown in Table 7. Those households reporting that they were able to obtain all that they needed purchased 50 percent more than the constrained households. Furthermore, a far larger percentage of households reporting quotas purchased other atta (unbleached flour), although the amount purchased by those households choosing to make purchases outside the subsidized system did not differ between the two subgroups.

It is noteworthy that a fourth of the households reporting no binding quota still purchase atta on the open market. This probably reflects a desire to upgrade the perceived quality of subsidized flour by mixing it with other grades. The 44 percent of all ration users who also buy other atta does not differ appreciably from the 46 percent of ration users in 1977 who obtained additional flour, despite the far higher rate of ration use in the earlier year.40

Before going on to an econometric analysis of flour purchases, it is worthwhile to present additional descriptive statistics on the use of flour by expenditure group. These data, reported in Table 8, complement those in Table 4 and confirm the importance of wheat in the diet of the average urban resident. More than half the calories consumed by the families interviewed came from wheat or wheat products. As expected, as incomes increase, this share declines. A similar decline in budget shares to wheat products was observed, as is to be expected for a good that is not a luxury. This figure is comparable to the figure of 0.073 calculated for the entire urban population using

39 There is evidence that quotas were more likely to be binding in the first round, but this variable is significant at the 10 percent level only.

40 Calculated from data in Pakistan, Planning Division, Micro-Nutrient Survey.
Table 8--importance of flour in budgets and diets, by income group

<table>
<thead>
<tr>
<th>Category</th>
<th>Entire sample</th>
<th>Expenditure Group</th>
<th>(Rs/capita/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&lt; 100</td>
<td>100 to &lt; 150</td>
</tr>
<tr>
<td>Average expenditure (rupees)</td>
<td>84</td>
<td>130</td>
<td>201</td>
</tr>
<tr>
<td>Percent of sample</td>
<td>1</td>
<td>6</td>
<td>25</td>
</tr>
<tr>
<td>Budget share to all flours, bread, and wheat</td>
<td>0.177</td>
<td>0.145</td>
<td>0.111</td>
</tr>
<tr>
<td>Budget share to all food items</td>
<td>0.565</td>
<td>0.585</td>
<td>0.538</td>
</tr>
<tr>
<td>Calorie share to all flours, bread, and wheat</td>
<td>0.582</td>
<td>0.604</td>
<td>0.554</td>
</tr>
<tr>
<td>Calories per capita per day</td>
<td>1,286</td>
<td>1,635</td>
<td>1,934</td>
</tr>
</tbody>
</table>

Ration users only

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Expenditure Group</th>
<th>(Rs/capita/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&lt; 100</td>
<td>100 to &lt; 150</td>
</tr>
<tr>
<td>Budget share to all flours, bread, and wheat</td>
<td>0.161</td>
<td>0.137</td>
<td>0.108</td>
</tr>
<tr>
<td>Budget share to ration flour</td>
<td>0.113</td>
<td>0.106</td>
<td>0.072</td>
</tr>
<tr>
<td>Budget share to all food items</td>
<td>0.512</td>
<td>0.572</td>
<td>0.509</td>
</tr>
<tr>
<td>Calorie share to all flours, bread, and wheat</td>
<td>0.691</td>
<td>0.624</td>
<td>0.589</td>
</tr>
<tr>
<td>Calorie share to ration flour</td>
<td>0.575</td>
<td>0.497</td>
<td>0.418</td>
</tr>
<tr>
<td>Calories per capita per day</td>
<td>1,111</td>
<td>1,574</td>
<td>1,940</td>
</tr>
</tbody>
</table>


If desired, budget share or calorie share to ration flour for the entire population could be obtained by multiplying the appropriate row by the corresponding percentage of users in Table 4.
Since subsidized flour provides relatively low-cost calories, in each income bracket ration users have lower expenditure shares for all wheat products, but higher calorie shares, than the corresponding group in the total population. Finally, by noting that ration users spend nearly 6 percent of their budgets on rationed flour, an estimate can be made of the loss in real income—that is, the increase in the cost of living—that these households would face if the subsidy were discontinued. If the ration price of flour were to go up from the official price of Rs 1.80 to the Rs 2.25 per kilo expected under the new system, these households would have an increase of 1.15 percent in the cost of living. Such a change, however, would be greater for those families in whose budgets flour represents a greater share—that is, low-income households. For the poorest third of this population, the increase would be 1.7 percent. If the price were to rise to the average price reported in the survey, however—the average reported price is Rs 2.62; this is the same as the price of flour of average quality as reported by the Bureau of Statistics—this increase would be 4.2 percent.

In the foregoing calculations, it was indicated that if the government could maintain a market price of flour at Rs 2.25, there would be some benefits to present recipients of the ration that would in part offset the price increase for rationed flour. These partial benefits would decrease—while the effect of the change in the cost of flour previously obtained at the ration depot would increase—the

41 The raw data were provided by the Federal Bureau of Statistics. This calculation excludes a few categories, such as taxes, ceremonials, and cash lost from total expenditures. It also includes bread with wheat products. These differences lead to a higher budget share to wheat than reported in the Pakistan, Federal Bureau of Statistics, Household Income and Expenditure Survey (Karachi, FBS, 1979).


43 The average budget share for wheat products for the ration users exceeds the average for the overall population, but this reflects the fact that this group has a greater proportion of low-income consumers.

44 This calculation presumes that the decrease in real income attributable to changes of the price of ration flour (1.4 percent) is offset in part by cheaper open-market flour and bread.

45 This would be 2.1 percent if changes in ration flour prices are not offset by declines in other flour prices.
higher the price that prevailed following derationing. Presumably there would be no offsetting benefits if flour remained at the average price observed in the survey. Similarly, the poor who did not purchase rationed flour would see a reduction of 1.7 percent in the cost of living if open-market prices fell to Rs 2.25 and corresponding smaller reductions with smaller decreases in the market price.

DETERMINANTS OF RATION FLOUR PURCHASES

As a prelude to the analysis of the factors that influence purchases of subsidized flour, it is necessary to introduce a brief discussion of the econometric techniques employed. As noted, less than half the total sample consumed subsidized flour, either because it was unavailable or because of their own preferences. Regression analysis that fails to account for the fact that many of the observed values of consumption of rationed flour are bunched at zero will produce biased estimates. This problem was first noted by Tobin, who devised a technique, now called Tobit estimation, which can be employed for estimations under such conditions. The approach used here is a two-step modification of Tobin's approach introduced by Heckman. Heckman's method is well known in labor economics, but it has been applied to demand studies as well.

The first step in the two-step approach is to estimate the probability of entry into the market—that is, to determine which factors influence a household's decision whether to buy ration flour. This step uses a nonlinear probit estimate, which constrains the probability of purchase to lie between zero and one. The second step is to estimate the quantity purchased, on the condition that purchases have been observed. This step includes as an independent variable a term—called the inverse of the Mill's ratio—which is a transformation of the predicted probability of purchases from the first step and which corrects for the sample truncation. This method is flexible because it allows for the causes of entry into the market to differ from the factors that influence the quantity purchased. This flexibility may be important when institutional factors hinder the clearing of the market.

46 Under such conditions, the OLS condition that the expected value of the error term is zero does not hold. See G. S. Maddala, Limited Dependent and Qualitative Variables in Econometrics (London: Cambridge University Press, 1983).


If there is no difference in the parameters in the two steps, the approach is equivalent to the one-step Tobit methodology.

The first step (probit) estimate of the probability that a household purchases subsidized flour is given below:

(1) \[ \text{Purchase} = -0.168 - 0.155 \text{Recent migrant} + 0.393 \text{Round 1} \]
\[ - 0.805 \text{Remittance} - 0.016 \text{HHsize} \]
\[ - 0.088 \text{Childshare} + 0.217 \text{Punjab} + 0.087 \text{Baluch} \]
\[ - 0.549 \text{NWFP} - 0.223 \ln(\text{exp}) + 1.482 \ln(\text{price}) \]
\[ - 2.081 \ln(\text{price}) \]

Chi square (11 d.f.) = 80.87, 
t-values in parentheses,

where

- **Purchase** = 1 if the ration shop is used and zero otherwise,
- **Recent migrant** = 1 if the household arrived in the city in the last 5 years and zero otherwise,
- **Round 1** = 1 if the interview was in April and zero otherwise,
- **Remittance** = 1 if any remittance is received from abroad and zero otherwise,
- **Punjab** = 1 if the household resides in the Punjab and zero otherwise,
- **Baluch** = 1 if the household resides in Baluchistan and zero otherwise,
- **NWFP** = 1 if the household resides in NWFP and zero otherwise,
- **HHSize** = number of family members,
- **Childshare** = number of children less than 6 years old divided by HH size,
The logarithm of per capita total expenditures in rupees per day,

\[ \text{Lnexp} = \log \text{of per capita total expenditures in rupees per day,} \]

the logarithm of the lowest price for nonrationed flour in the neighborhood,

\[ \text{Llowprice} = \log \text{of the lowest price for nonrationed flour in the neighborhood,}^{49} \]

the logarithm of the ration price in the neighborhood.

\[ \text{Lrpris} = \log \text{of the ration price in the neighborhood.} \]

The regression was estimated using 711 households who reported that a ration shop was locally available.

Equation 1 indicates that there is a statistically significant greater use of the ration shop during the preharvest season. Families with greater total expenditures (a proxy for income) have a lesser likelihood of making ration purchases. Furthermore, families who receive remittances from abroad (5.5 percent of the sample) have a lesser likelihood of purchases than other families whose total expenditures are similar. The significant negative sign on the coefficient for the NWFP probably reflects the tendency of residents in that region to purchase nan from the bazaar rather than prepare the bread at home.\(^{50}\) Recent migrants to urban areas have neither a greater nor a lesser tendency to purchase rationed atta. Finally, the sign for the coefficient of the price of the least expensive alternative flour is positive, as expected if households substitute away from it as open wheat flour becomes more expensive, while the coefficient of the price of ration flour itself is negative and significant.

The results of the regression explaining the quantity purchased, if purchases are greater than zero, are given in Equation 2.

\[ (2) \text{Ratcapm} = 15.26 + 0.190 \text{Recent migrant} - 0.569 \text{Round 1} \]

\[ + 1.03 \text{Punjab} + 2.59 \text{Baluch} + 2.92 \text{NWFP} - 0.178 \text{HHSize} \]

\[ - 3.48 \text{Childshare} - 2.29 \text{Quota} + 0.78 \text{Lnexp} \]

\[ - 2.39 \text{Llowprice} - 7.35 \text{Lrpris} - 0.79 \text{IM}, \]

\[ R^2 = 0.27, \]

\(^{49}\) This is not a minimum value, but the average throughout a neighborhood of the response to the question "What is the Lowest price at which flour is sold locally?"

\(^{50}\) This difference may decline during the cooler months; some households mentioned that they stop baking in their own homes when the weather turns warm.
where

\[ \text{Ratcapm} = \text{kilos of ration flour per capita per month}, \]
\[ \text{Quota} = \text{one if the household reports inability to obtain all their requirements and zero otherwise}, \]
\[ \text{IM} = \text{inverse of the Mill's ratio}, \]

the other variables are as in Equation 1.

While household demographics and region of residence are significant in explaining the quantity purchased, neither total expenditure nor the price of alternative flour significantly determines the quantity purchased. One variable that is significant is the dummy variable for quota, which confirms the result given in Table 7 that the restriction strongly influences purchase where it is imposed. Since authorities have the option of changing the rules of operation of the distribution without necessarily eliminating the entire system, this observation implies that a ration system without quotas per household would improve the self-targeting nature of the transfer.

The income elasticity for the two equations combined is -0.13. \(^{51}\)

The parameters in this model imply an own-price elasticity of -3.04 and a cross-price elasticity of 1.20. Both these values are higher in absolute value than is generally observed for food commodities. This probably reflects a fine commodity distinction—different qualities of flour that are close substitutes for each other. Furthermore, cross-sectional (spatial) variation in prices is used in this study, which may reflect long-run differences in markets and administrative guide-

51 Using the estimation technique here, derivatives can be calculated by recognizing that the average quantity of flour purchased (Q) is the product of the probability of purchases (PR) times the quantity purchased if greater than zero (Q*). Therefore

\[
\frac{\partial Q}{\partial X} = \frac{\partial PR \times Q^*}{\partial X} + \frac{\partial Q^*}{\partial X} \times PR
\]

Note that the coefficients in Equation 1 are not the derivatives. Probit equations are nonlinear and the derivatives vary at different levels of the explanatory variables. They are calculated at the mean here and will be 0.38 times the values in Equation 1. Note also that while many coefficients are not significantly different from zero, they remain the best (unbiased) estimates of the true response and are used in the foregoing calculations.
Such long-run elasticities often differ from short-run estimates. This cross-section evidence of price responsiveness is consistent with time-series analysis of the Bangladesh ration system. It does not offer a strong explanation for changes in use of the ration, however, since the relative price position has not changed appreciably during the decade. Indeed, the price ratio was higher in 1986 than in 1976, which implies a tendency toward increased consumption of ration flour in 1986.

Since it has been proposed that the quality of ration flour has declined since 1977, it is interesting to note that the income elasticity calculated from the MNS, using a methodology similar to that used in Equations 1 and 2, is 0.11 at mean expenditures and somewhat lower at higher expenditures. This indicates that the self-targeting nature of the program was more apparent in 1986. It does indicate some change in consumer preferences for the flour, moreover. It is not possible, however, to test for changes in perceived qualities of flour with the type of data available. Nevertheless, it can be noted that applying the negative income elasticity from Equations 1 and 2 to the average growth in per capita income during the period 1977-86 explains only a small portion of the decline in observed household consumption. Since relative prices do not explain this shift either, one must fall back on a structural explanation or a shift in consumer attitudes to explain the decline.

PURCHASES OF FLOUR AND WHEAT PRODUCTS

So far, the focus of the analysis has been on purchases of ration flour. Such purchases are only 24 percent of total flour purchases, by value, however, and 30 percent of flour purchases by weight. It is important, therefore, to study purchases of all types of wheat products in addition to ration flour. Since the number of households who do not consume any flour—or any wheat products at all—is relatively small, it is possible to run OLS with such an analysis: 85 percent consume some form of flour, while 99 percent consume wheat, bread, or flour. Because there are some theoretical and econometric advantages to using budget shares as the dependent variable in demand equations, such an

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52 Differences in reported prices for ration atta are reported in Federal Bureau of Statistics, *Monthly Statistical Bulletin*, as well as in the data used here. These prices are higher in parts of the Sind.


approach is employed in the regression for purchases of flour in Equation 3.55

(3) \[ \text{Watta} = 0.219 + 0.008 \text{Punjab} + 0.011 \text{Baluch} + 0.001 \text{NWFP} \]
\[ + 0.0010 \text{Round 1} - 0.0008 \text{HHSize} - 0.010 \text{Childshare} \]
\[ + 0.0008 \text{Depot} + 0.058 \text{Lflprice} + 0.0137 \text{Lriceprice} \]
\[ - 0.129 \text{Lnexp} + 0.0145 \text{Lnexpsq}, \]
\[ R^2 = 0.47; n = 992, \]

where

\[
\begin{align*}
\text{Watta} & \quad \text{is the budget share to all atta}, \\
\text{Lflprice} & \quad \text{is an index of ration, bagged, and other open market flour prices}, \text{ and} \\
\text{Lriceprice} & \quad \text{is the log of the price of rice}. \\
\text{Other variables have been previously defined.} \\
\end{align*}
\]

The expenditure elasticity at the sample mean is 0.265 and the own-price elasticity is -0.093. While this is far less than the estimate of the price response of ration flour, the own-price elasticity of an aggregate of similar goods is generally smaller in

55 The advantages include the ease of using adding up restrictions so that budgets are totally accounted for as well as the reduction in heteroscedasticity if, as is sometimes observed, the variance of expenditures on a commodity increases with total expenditures. Budget shares, however, cannot be used as a dependent variable in tobit analysis (see Mark Pitt, "Food Preferences and Nutrition in Rural Bangladesh," Review of Economics and Statistics 65 [February 1983]: 105-114). Hence the different dependent variable in Equation 2.

56 The index includes open-market flours and bagged flour where depots are not available. Such an approach assumes that the ration is also distinguished as a distinct good and does not handle quotas as binding. This approach then differs from that of Ehtisham Ahmad, H. M. Leung, and Nicholas Stern, "The Demand for Wheat Under Non-Linear Pricing," London School of Economics, London, November 1986.
absolute value than the own-price elasticity of a subset of that aggregate. The cross-price elasticity with rice is 0.225.

Equation 4 presents a similar regression, in which the dependent variable includes expenditures on bread and nan along with wheat and flour.

\[(4) \quad W_{wheatproducts} = 0.270 + 0.012 \text{Punjab} + 0.0215 \text{Baluch} + 0.034 \text{NWFP} - 0.002 \text{Round 1} - 0.001 \text{HHSize} + 0.012 \text{Punjab} + 0.0215 \text{Baluch} + 0.034 \text{NWFP} - 0.002 \text{Round 1} - 0.001 \text{HHSize} \]

\[+ 0.012 \text{Punjab} + 0.0215 \text{Baluch} + 0.034 \text{NWFP} - 0.002 \text{Round 1} - 0.001 \text{HHSize} (3.60) (4.40) \]

\[+ 0.012 \text{Punjab} + 0.0215 \text{Baluch} + 0.034 \text{NWFP} - 0.002 \text{Round 1} - 0.001 \text{HHSize} (6.05) (0.97) (3.26) \]

\[+ 0.012 \text{Punjab} + 0.0215 \text{Baluch} + 0.034 \text{NWFP} - 0.002 \text{Round 1} - 0.001 \text{HHSize} (1.28) (0.456) \]

\[- 0.010 \text{Childshare} + 0.003 \text{Depot} (2.42) (0.85) \]

\[- 0.010 \text{Childshare} + 0.003 \text{Depot} - 0.056 \text{Lwheatindex} - 0.005 \text{Lriceprice} (2.42) (0.85) \]

\[- 0.010 \text{Childshare} + 0.003 \text{Depot} - 0.056 \text{Lwheatindex} - 0.005 \text{Lriceprice} - 0.013 \text{Lnexp} + 0.014 \text{Lnexpsq} (15.90) (9.75) \]

\[R^2 = 0.54; \quad n = 992, \]

where

\[W_{wheatproducts} = \text{the budget share to breads, flours, and wheat itself, including the value of home production and gifts.} \]

The expenditure elasticity at the mean expenditure is 0.34 and the own-price elasticity is -0.28. In this equation, the cross-price with rice is not significant, while the previously insignificant dummy variable for the NWFP is now positive and highly significant. This is because a number of households in the NWFP consume nan and do not purchase flour.

The wheat-products expenditure elasticity is similar to the elasticity of 0.35 at the mean expenditure estimated from the 1979 and 1982 urban household expenditure surveys\(^5^7\) and one of 0.28 estimated from the MNS data.\(^5^8\) Given that cross-sectional estimates are frequently

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\(^{58}\) Ehtisham Ahmad, H. M. Leung, and Nicholas Stern, "Demand Response in Pakistan: A Modification of the Linear Expenditure System for 1976," London School of Economics, London, August 1986. Elsewhere estimates of 0.07 are estimated from the data (Ahmad, Leung, and Stern, "Demand for Wheat under Non-Linear Pricing").
higher than those from time series, this is also consistent with time-series estimates of 0.19 for the period 1971-84.\textsuperscript{59} The similarity of these figures provides confidence for projections of wheat consumption for the purpose of discussions of the general wheat subsidy. It should also be noted that urban wheat consumption should grow at a rate 1-2 percent higher than the rate of population growth--including net migration. This implies a similar rate of growth in the current general subsidy, holding other things equal.\textsuperscript{60}

There is less uniformity in the literature regarding estimates of price elasticities for wheat products. This reflects both the general difficulty of estimating price parameters for disaggregate commodity groups and specific difficulties entailed by the absence of detailed price data in the published data for some of the larger national consumer surveys and by the existence of more than one price for flour, with quotas determining the amount available at the ration price. Published estimations of price response for wheat differ in regard to the econometric techniques employed to handle these problems and to assumptions as to how rigidly quotas are enforced and whether ration flour is identical to market alternatives. Since the range of previous estimates goes from virtually zero to -0.88 for wheat products as a whole, it is not surprising that the estimates here of -0.09 for flour and -0.28 for all wheat products fall within that range.\textsuperscript{61}

Using the information on price response, it is possible to modify the estimates of loss of real income implied by budget shares to various qualities of flour discussed earlier to take substitution into account. Given the range of uncertainty with which price response is estimated, no attempt is made to employ the more refined conceptions of consumer surplus that can be derived, in theory, using income compensation functions rather than demand curves.\textsuperscript{62} For policy purposes,

\textsuperscript{59} Hamid et al., "The Wheat Economy of Pakistan." Peter Cornelisse and Bart Kuijpers, in "A Policy Model of the Wheat and Rice Economy of Pakistan," Erasmus University, Rotterdam, 1987 (mimeographed), report an income elasticity of 0.42 for 1985 based on a time-series estimate in which the elasticity declines with income.

\textsuperscript{60} A comparison of the 1984/85 and the 1979 budget survey indicates a decline in per capita wheat and flour consumption in that period. The inference of a negative income elasticity from this comparison, however, without price data or other observations, seems premature in the light of previous results.

\textsuperscript{61} Alderman, in "Estimates of Consumer Price Response in Pakistan," reports an elasticity of -0.31 using an AIDS complete system of demand estimation with 1979 and 1982 data.

it is sufficient to approximate the change in consumer surplus when going from $P_0$ to $P_1$ by the formula $(P_0 - P_1) Q_0 - (P_0 - P_1)(Q_0 - Q_1)/2$. With an increase in price, $P_0 - P_1$ is negative, and the first term in the formula is the loss of surplus, holding consumption at initial levels. If consumption declines, however, $Q_0 - Q_1$ will be positive and subtracting the second term will reduce the loss; consumers mitigate the negative effects of an increase in price and enhance the favorable effects of a decrease in price by modifying their initial purchases. Estimates of the change in consumer surplus for a family of seven will be presented in Table 9. These estimates include the effects of the reduction of subsidies on bread in the NWFP.

Table 9--Monthly changes in consumer surplus following changes in the price of flour

<table>
<thead>
<tr>
<th>Option</th>
<th>Change in Surplus</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ration Users</td>
<td>Nonusers</td>
</tr>
<tr>
<td></td>
<td>(Rs/family/month)</td>
<td></td>
</tr>
<tr>
<td>Ration price increase is Rs 0.45;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>open-market decrease is Rs 0.00:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No price response</td>
<td>-25.67</td>
<td>0.00</td>
</tr>
<tr>
<td>Ration flour price:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elasticity = -1.0</td>
<td>-22.52</td>
<td>0.00</td>
</tr>
<tr>
<td>Elasticity = -3.0</td>
<td>-16.22</td>
<td>0.00</td>
</tr>
<tr>
<td>Ration price increase is Rs 0.45;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>open-market decrease is Rs 0.35:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open market wheat and flour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>elasticity = -0.3</td>
<td>-17.52</td>
<td>22.51</td>
</tr>
</tbody>
</table>

Notes: Calculated using average levels of consumption from the IFPRI-PIDE survey for a family of seven members. The table includes the changes attributable to the increase in the price of bread (nan) in the NWFP.

Clearly, there are numerous variations that can be reported, depending on the assumed changes in prices and the assumed elasticities. Two basic points are illustrated in Table 9, however. First, the loss of real income estimated by multiplying initial quantities by the change in price is a lower limit to the welfare loss to consumers. Users of ration flour gain some subjective welfare when they shift to flour of higher quality that offsets part of the initial welfare loss. The greater the substitutability of other flour or of other goods for ration flour, the greater this compensation. The more negative the own-price elasticity, the more such substitution takes place. Second, if wheat products and bread become cheaper, all consumers will benefit
from such a decline in price in proportion to their initial consumption plus the increment in consumption of wheat following the price change. This increment, however, is relatively small because demand for the wheat commodity group is fairly inelastic.

Both the substitution of one quality of flour for another and the assumed change in the prices of flour and breads on the open market reduce the negative welfare effects for the families that previously used ration flour. Note that the average decline in consumer surplus for ration users (in column D) is slightly lower than the wage compensation for government employees. While families whose members are unemployed or are employed in the private sector will lose in relation to other households, the magnitude of this loss does not appear to be sufficient to justify expensive or administratively complex targeted programs as alternatives to the present policies. As will be discussed in the following chapter, however, this view is not meant to imply that there is no urban poverty or that there are no potential gains from welfare and nutrition programs. This need existed before derationing and is likely to continue after it.

If, and only if, quotas are exogenous to the household, the ration can be included as an independent variable in a regression. Since total flour is open-market purchases + ration = \( f(T, P) \), open-market purchase = \( f(T, P) - \text{ration} \) can also be regressed.

If the ration is a perfect substitute for purchases on the open market, the coefficient of ration would be -1, while if purchases of flour on the open market are independent of ration-flour, this coefficient will be 0. Using a tobit regression on the subsets that reported a quota, the coefficient of ratio per capita was -0.67 \((t = 8.33)\). This indicates less than one-to-one substitution between the two types of flour, although substitution is clearly present.

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63 It is presumed here that ration users were initially paying Rs 1.80. This is the most frequently reported official release price, although the average price reported by consumers was closer to Rs 2.00.

64 This ignores the relatively small income effect embodied in the ration.

65 From Table 7, it is possible to calculate the average open-market purchase for all families with quotas as 3.62 kilos \((0.78 \times 4.64)\) and that for families with no quota as 0.94. The difference in ration obtained, if there is no quota, multiplied by the 0.67 coefficient, gives 2.07, which is slightly smaller than the 2.69 difference in average open-market purchase between the two subgroups.
FLOUR PRICES AND QUALITY

In the foregoing analysis, the standard practice of assuming prices to be exogenous to the household was followed; that is, even though prices are determined by both supply and demand, individual households are presumed not to influence the price they must pay. Recently, however, researchers have revived the issue of quality choice.66 This issue was sidestepped in Equations 1 and 2 by defining ration flour as a commodity distinct from other flour. When the dependent variable is an aggregate of various qualities as in Equations 3 and 4, however, it is worthwhile to investigate quality effects. By defining the logarithm of the unit cost of flour as an index of quality, quality elasticities can be estimated by Equation 5.

\[
(5) \quad \ln(\text{attaprice}) = 0.960 - 0.56 \text{Punjab} - 0.049 \text{Baluch} + 0.108 \text{NWFP}
\]

\[
- 0.007 \text{Round } 1 + 0.024 \ln(\text{exp}) - 0.032 \text{Depot},
\]

\[
R^2 = 0.17; n = 691.
\]

The basic feature of that regression is that the quality elasticity for flour—the coefficient of \(\ln(\text{exp})\)—is small, although significantly different from zero. The dependent variable in Equation 5 is the unit value for bagged or loose flour in the market.67 When ration flour is also included by dividing total flour expenditures by total quantity purchased, the result is the somewhat higher elasticity of 0.04.68 This, however, is still a low quality elasticity. The quality elasticity of rice is 0.14, for example, while that of meat and poultry as a joint category is 0.26. The total expenditure elasticity of wheat, derived from the foregoing budget-share equations, can be regarded as the sum of the quantity elasticity and the quality elasticity; the small quality elasticity implies that most of the expenditure elasticity reported earlier pertains to increases in quantity.

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67 In this sample there is some sample censoring bias, which is ignored here.

68 This is smaller than expected, given the shift from ration atta with increasing income, but recall that many of the families that purchase ration flour also purchase other flour and hence have unit values above the ration price.
Equation 5 also indicates that consumers in Baluchistan (mainly in Quetta) and the Punjab were charged lower prices than consumers in the other provinces, while in the NWFP prices were significantly higher than in the Sind, for which no dummy variable was included. No differences were observed between rounds. More important, however, flour prices on the open market were significantly lower--3 percent--where a depot was present than they were elsewhere; the figure is 4 percent if prebagged flour--a small portion of which is subsidized in the Punjab--is excluded. As expected, the presence of a depot does not affect rice prices. The interpretation of these results is not straightforward. A ration shop may serve as a competitor to other merchants, requiring them to lower price margins. If such is the case, an increase in the number of utility stores that market flour as well as many other food items with only a small markup over costs may serve a similar function. Alternatively, the result in Equation 5 may indicate that releases to the mills that were earmarked for the ration system but ended up in other market channels acted as open-market operations, increasing supplies and, hence, lowering prices. Such a potential remains with MINFA after derationing.

THE EFFECT OF DERATIONING ON SHOPKEEPERS

One group who voiced concern over derationing were the owners of ration shops. Since this study does not determine whether diversion from the ration system occurs at the depot or upstream, it cannot be determined whether their concern is over the loss of a legitimate livelihood or over the loss of unauthorized profits. Presuming the former, the income loss expected by the average depot holder was estimated.

Cornelisse and Naqvi indicate that the gross margin for ration shop owners was between Rs 6.65 and 12.95 per 85-kilogram bag (1982 prices). The bulk of this profit came from the Rs 5.5-7.0 resale value of the bag itself. As an illustration, consider a shopkeeper with potential sales to 500 registered families in keeping with the number in Cornelisse and Naqvi's study. If each family took a ration of 60 kilos, the shopkeeper's gross profit for the month would range between Rs 2,310 and Rs 4,500 a month in 1982 rupees.

If, however, only 25 percent of the families where a depot is present--the nationwide average in the IFPRI-Gallup surveys--used

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69 In 1986, only 300 of such shops were functioning nationwide. This is a decrease from 764 in 1978. Only one family in the survey used such a store. The Ministry of Industry, however, which oversees such stores, plans to increase the number of outlets and mobile units as well as intensify advertising in response to derationing.

70 Cornelisse and Naqvi, *The Anatomy of the Wheat Market*.  

---
the depot, the gross profits would be reduced correspondingly to Rs 577-Rs 1,125 per shop a month. Shopkeepers in low-income neighborhoods surely do better than this average, since rates of use are higher in these neighborhoods, as indicated in the IFPRI-PIDE survey. Unless the number of families per shop was higher in 1986 than it was in 1976 or 1982—which, though plausible, would belie the data on number of shops in the various provinces in Table 5--gross profits from flour sales by an appreciable percentage of these were less than monthly earnings of unskilled laborers.

The persistence of these shops is explained in part by the fact that managing such a depot was often only a part-time occupation. A number of shops were open only a few hours a day or a few days a week. Others were open full time but contained many other items for sale in addition to flour. These shopkeepers, then, suffer less of a risk of unemployment than reduced earnings following derationing. The shops are still able to handle flour following derationing, however. Since there is no reason to expect that the authorized margin on ration flour was different from the gross margin on other flour and since the total volume of flour sold in the country should not decrease with derationing--indeed, it should increase slightly as a result of price response--total gross profits to retail merchants should not decrease. Although individual shopkeepers may suffer losses, other retailers in the same vicinity will increase their sales. There are no data by means of which to measure the net effect of such a shift on income distribution. There is no reason, however, to expect that retail trade in flour is likely to become concentrated among a few merchants. Former ration shopholders are free to compete for the profits in retailing flour. The government has made loans of up to Rs 25,000 available to assist such shops in becoming competitive with other merchants. There is no strong evidence that further intervention to protect the former depot holder's livelihood is needed. There is, however, a danger that such an intervention will decrease the savings from derationing. There is a risk, moreover, of encouraging rent seeking and special privileges.
4. THE ALLEVIATION OF URBAN POVERTY

The original design of this study included plans to investigate alternative means of compensating households in the event of derationing. This design included modeling of the costs and effects of various targeted distribution systems. Events moved faster than this research, however. The findings presented in Chapter 3, moreover, do not indicate significant adverse effects attributable to the derationing on the standard of living of former ration users. The rationale for the discussion of targeted rations is therefore no longer apparent. Still, health and nutrition indicators for low-income urban neighborhoods and calorie consumption data presented in Table 8 provide evidence that state of the nutrition and health of a significant portion of the population remains low. While data from a survey cannot determine the social norms by which the priorities of poverty alleviation programs are determined, the data collected in the course of studying the ration system can be useful, both as an indicator of living standards and for the design of poverty alleviation programs. Accordingly, despite the opinion expressed earlier that derationing does not, in itself, cause particular hardship for low-income consumers, a discussion of the alleviation of urban poverty is still an appropriate component of this study of household food security.

THE DEMAND FOR FOOD AND NUTRIENTS

Levels of calorie and protein consumption are indicators, albeit imperfect, of nutritional risk. As national and, to a lesser degree, household levels of availability and consumption of these nutrients are relatively easy to monitor, poverty programs frequently include target levels for consumption of calories, protein, or both. The nutritional effects of such welfare programs, allied distributional programs, or growth in general income depend, in part, on the target household's propensity to increase its intake of nutrients with increased in-

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comes. Such responsiveness, as measured by expenditure elasticities for calories, protein, and total food expenditures, can be calculated using the estimates in Table 10.

### Table 10--Regression of the demand for nutrients and food

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Calories (1)</th>
<th>Calories (2)</th>
<th>Protein (3)</th>
<th>Protein (4)</th>
<th>WFood (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1,827.60</td>
<td>1,807.20</td>
<td>2.60</td>
<td>36.38</td>
<td>0.88</td>
</tr>
<tr>
<td>Punjab</td>
<td>-116.40</td>
<td>-63.23</td>
<td>-0.894</td>
<td>-8.58</td>
<td>-0.067</td>
</tr>
<tr>
<td></td>
<td>(2.51)</td>
<td>(1.30)</td>
<td>(5.27)</td>
<td>(5.17)</td>
<td>(6.18)</td>
</tr>
<tr>
<td>Baluch</td>
<td>119.20</td>
<td>251.37</td>
<td>-2.00</td>
<td>1.43</td>
<td>-0.023</td>
</tr>
<tr>
<td></td>
<td>(1.37)</td>
<td>(2.65)</td>
<td>(0.74)</td>
<td>(0.44)</td>
<td>(1.08)</td>
</tr>
<tr>
<td>NWFP</td>
<td>138.30</td>
<td>-0.7345</td>
<td>0.12</td>
<td>-2.99</td>
<td>-0.1154</td>
</tr>
<tr>
<td></td>
<td>(1.44)</td>
<td>(0.10)</td>
<td>(0.04)</td>
<td>(1.16)</td>
<td>(0.68)</td>
</tr>
<tr>
<td>Round 1</td>
<td>75.10</td>
<td>62.19</td>
<td>1.34</td>
<td>0.24</td>
<td>0.0356</td>
</tr>
<tr>
<td></td>
<td>(1.90)</td>
<td>(1.61)</td>
<td>(0.96)</td>
<td>(0.18)</td>
<td>(4.12)</td>
</tr>
<tr>
<td>HHSize</td>
<td>-45.13</td>
<td>42.05</td>
<td>1.54</td>
<td>1.47</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(8.64)</td>
<td>(2.33)</td>
<td>(2.50)</td>
<td>(2.38)</td>
<td>(0.39)</td>
</tr>
<tr>
<td>ChildShare</td>
<td>-527.21</td>
<td>-511.04</td>
<td>-14.85</td>
<td>-14.74</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(4.14)</td>
<td>(4.08)</td>
<td>(3.47)</td>
<td>(3.45)</td>
<td>(0.05)</td>
</tr>
<tr>
<td>Visitor</td>
<td>306.28</td>
<td>281.50</td>
<td>7.69</td>
<td>7.66</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>(4.64)</td>
<td>(4.32)</td>
<td>(3.45)</td>
<td>(3.45)</td>
<td>(1.26)</td>
</tr>
<tr>
<td>LnExp</td>
<td>1,292.95</td>
<td>1,790.76</td>
<td>52.08</td>
<td>51.96</td>
<td>-0.14</td>
</tr>
<tr>
<td></td>
<td>(8.70)</td>
<td>(10.22)</td>
<td>(8.69)</td>
<td>(8.69)</td>
<td>(10.63)</td>
</tr>
<tr>
<td>LnExpSq</td>
<td>-160.24</td>
<td>-200.72</td>
<td>-5.41</td>
<td>-5.39</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>(6.03)</td>
<td>(7.35)</td>
<td>(5.79)</td>
<td>(5.78)</td>
<td></td>
</tr>
<tr>
<td>HHSize x LnExp</td>
<td>-0.09</td>
<td>-35.15</td>
<td>-1.12</td>
<td>-1.07</td>
<td>-0.002</td>
</tr>
<tr>
<td></td>
<td>(1.74)</td>
<td>(4.98)</td>
<td>(4.64)</td>
<td>(4.45)</td>
<td>(1.95)</td>
</tr>
<tr>
<td>LnRiceprice</td>
<td>-727.22</td>
<td>...</td>
<td>-8.53</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>(3.59)</td>
<td>(2.51)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LnLow Wheatprice</td>
<td>-12.52</td>
<td>...</td>
<td>-1.56</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>(0.10)</td>
<td>(0.36)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LnFoodprice</td>
<td>...</td>
<td>-1,000.46</td>
<td>...</td>
<td>-21.17</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>(4.49)</td>
<td>(2.78)</td>
<td>(0.24)</td>
<td>(0.24)</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.38</td>
<td>0.39</td>
<td>0.36</td>
<td>0.36</td>
<td>0.43</td>
</tr>
</tbody>
</table>

*a Not statistically significant in initial estimates.

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The expenditure elasticities for calories and protein of mean consumption levels are 0.22 and 0.25, calculated from Equations 2 and 4, respectively. The estimated calorie elasticity is the same as that estimated by McCarthy for the poorest 40 percent of the urban population from 1968 through 1972. This estimate of the expenditure elasticity for total foods is 0.66 at the mean. Since projects for the alleviation of poverty generally target only a subset of the population, it is useful to report similar estimates of elasticity for low-income groups. These are indicated in Table 11. Calorie and food expenditure elasticities, however, are 0.40 and 0.72, respectively, for the households whose monthly per capita expenditures are Rs 200 and calorie consumption is 1,934 kilocalories per capita a day. This is calculated from Equations 2 and 5 in Table 10, using the average values for surveyed households with expenditures between Rs 150 and Rs 250. Households whose expenditures are between Rs 100 and Rs 150 have a calorie elasticity of 0.58 and a food expenditure elasticity of 0.75.

Table 11--Expenditure elasticities for food groups

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Monthly Expenditure Group</th>
<th>At the Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;100&lt;150&lt;250&lt;400&gt;400</td>
<td></td>
</tr>
<tr>
<td>Calories</td>
<td>0.88 0.53 0.40 0.25 0.07</td>
<td>0.22</td>
</tr>
<tr>
<td>Protein</td>
<td>0.94 0.61 0.43 0.27 0.09</td>
<td>0.25</td>
</tr>
<tr>
<td>All food expenditures</td>
<td>0.73 0.75 0.72 0.67 0.54</td>
<td>0.66</td>
</tr>
<tr>
<td>Wheat products</td>
<td>0.43 0.39 0.31 0.20 0.19</td>
<td>0.34</td>
</tr>
<tr>
<td>Rice</td>
<td>0.66 0.65 0.62 0.57 0.38</td>
<td>0.56</td>
</tr>
<tr>
<td>Milk products</td>
<td>0.90 0.89 0.84 0.77 0.51</td>
<td>0.69</td>
</tr>
<tr>
<td>Meat, fish, poultry, and eggs</td>
<td>1.32 1.37 1.15 1.01 0.68</td>
<td>0.87</td>
</tr>
<tr>
<td>Vegetables and fruit</td>
<td>0.52 0.47 0.49 0.43 0.38</td>
<td>0.49</td>
</tr>
<tr>
<td>Sugar and gur</td>
<td>0.59 0.65 0.57 0.51 0.22</td>
<td>0.47</td>
</tr>
<tr>
<td>Oil and vegetable ghee</td>
<td>0.46 0.54 0.51 0.40 0.21</td>
<td>0.44</td>
</tr>
</tbody>
</table>

Since all elasticities are calculated by dividing by average consumption or budget share, the small size of this group renders the divisors— and therefore the estimates—sensitive to individual errors.

73 F. Desmond McCarthy, "Food Consumption, Income Distribution, and Quality Effects," Food Policy 4 (February 1977): 79-82. This study does not indicate whether Bangladesh is included or not. His estimates of protein elasticities are not comparable to those used for this study, because his study separates vegetable protein and animal protein, a separation that is no longer advocated by nutritionists.
A transfer of Rs 1 per capita a day--Rs 30 a month--to households with total expenditures of Rs 200 per capita would increase per capita calorie consumption by 116 calories a day. Since the recent wage increase of Rs 20 a month is distributed over a household, however, it would lead to an average increase of approximately 30 calories a day. The moderate effect of this salary increase is attributable to the relatively small wage increase rather than to a low tendency on the part of low-income households to purchase calories. Indeed, a calorie elasticity of 0.4 is comparatively high for an urban household. This indicates a potential function for cash or transfers in kind in reducing the risk of malnutrition.

As expected, the variable child share in Table 10 implies that the higher the proportion of young children, holding family size and per capita income constant, the fewer calories or the less protein a household consumes. The visitor variable has the expected sign and corrects for the fact that hospitality will cause an increase in food purchases. The variable does not indicate the calorie value of the meals given to the visitors, however, because the coefficient is the product of that calorie value times the percentage of meals in the flexible recall period at which visitors were present. This percentage is not known, so the calorie value is not identified.

The negative value for the price of rice in Equations 1 and 3 implies that an increase in rice prices leads to a decrease in overall consumption of nutrients. Somewhat surprising, an increase in the lowest available price of wheat has no effect. The elasticity of total calories with respect to an index of total food prices--a Stone's index weighted by average budget shares--is -0.42 at the mean calorie intake. After the real income effect of a change in food prices has been accounted for, the compensated price elasticity is -0.12. This result is in contrast to Equation 5, which implies that the overall price elasticity for food is not significantly different from -1.0. If so, the compensated price elasticity is -0.8. While, as mentioned, using cross-sectional data with limited and often incomplete price data for estimating price elasticities must be used with caution, the difference can also be explained as a quality response. When prices rise, households decrease the average quality--or the unit price--of the food that they consume but the amount of food consumed remains roughly the same after changes in real income have been accounted for.

The issue of quality in regard to the choice of types of flour purchased has already been discussed. Within such a category, changes in quality as defined by consumer preferences may not entail changes in

74 Even more surprising, an increase in an index of wheat and flour prices has a positive effect.

75 The underlying theory is discussed in Deaton, Quality and Spatial Variation of Price.
nutritional quality, or they may even entail a decline. As incomes rise, however, consumers also shift the proportion of their food expenditures that they allocate to different commodities. (As incomes increase, the commodity groups in Table 11 with the higher expenditure elasticities claim an increasing share of the total allotment to food.) This shift between commodity groups is generally from inexpensive sources of calories and proteins to more expensive sources; the elasticity for the unit cost of calories calculated in a manner similar to Equation 5 is 0.22 (t = 19.43). This tendency for all consumers to shift food allocations to preferred commodities is sometimes interpreted as evidence that none but the very poorest of the poor are constrained by their income level to consume an inadequate amount of food. As the data in the next section illustrate, however, malnutrition is still prevalent in urban Pakistan. While food habits may respond in time to nutrition education, the information on consumer spending in Tables 10 and 11 indicates the current spending patterns and the environment in which price and income policy must operate.

Clearly, as incomes increase, even the highest expenditure group will increase its expenditures on all food commodities, although for all goods, this proportional increase is less than the increases at lower expenditures. The expenditure elasticities for food commodities are highest for the categories of dairy products and meat products. Even for these commodities, however, the goods are not luxury goods—as defined by expenditure elasticities greater than 1. It is somewhat of a surprise that the elasticity for vegetables and fruits is relatively low for low-expenditure groups. These foods, which are often consumed in small quantities in poor households, are important sources of micro-nutrients, even if they are expensive sources of calories and protein.

THE PREVALENCE OF MALNUTRITION AND THE INCIDENCE OF ILLNESS

While average food consumption in the sample of low-income urban neighborhoods is adequate, such a statistic is only a rough indicator of nutritional risk. Not only is there a low average calorie intake for the poorest third of the urban sample, but there are also a number of community-wide indicators that point to serious health and nutrition problems. The households in the sample, for example, reported a total of 133 deaths among children under five years of age.76 This is

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76 Such an estimate can be only a rough indicator of annual mortality compared to a prospective demographic study, for households tend to telescope their recollections of distant events into the recall period. Note that recollected deaths of males outnumbered deaths of females two to one in this sample. Females often disappear in household surveys in Pakistan. See Karol Krotki, "Reported Masculinity Ratio in Pakistan: A Triumph of Anthropology and Economics over Biology," Pakistan Development Review 24 (1985): 267-297.
roughly one out of every ten children in the sample; on the average, there was one reported death of a child for every seven families.

Malnutrition is also widespread. The survey indicated that 7.3 percent of the children five years old or under were acutely malnourished by the Waterlow classification—less than 80 percent of the median weight-for-height—while 30 percent showed signs of chronic malnutrition—heights less than 90 percent of the median height-for-age. Using the Gomez classification of malnutrition—which does not distinguish between acute and chronic malnutrition and is also more sensitive to errors in the recording of ages—0.6 percent of the children were severely malnourished (Grade III) and another 23.4 percent were moderately malnourished.

Few published reports of the nutritional status of urban populations exist for comparison. Using a sample of children taken by the families to clinics—hence a biased sample—it was found that 6.0 percent of Karachi infants two years old and under were severely malnourished and 7.9 percent were moderately malnourished. Similarly, in a study undertaken by the World Health Organization severe malnutrition was found in urban Sind in 6.5 percent of the children less than two years old, while in urban Punjab only 4 percent were malnourished. Rates of moderate malnutrition were 17.5 percent and 14.0 percent, respectively. By comparison, the rate of severe malnutrition in rural Sind was 17.5 percent, while it was 6.0 percent in rural Punjab. The data here, then, indicate a lower rate of severe malnutrition and a higher rate of moderate than observed elsewhere.

In a similar vein, it can be noted that the incidence of disease among children in the sample is also high. As indicated in Table 12, more than 40 percent of all children were ill during the two weeks previous to the survey. The average household spent Rs 47 a month on medicine and care for children five years old or under. This expenditure is an average of the entire sample, including households with no children or no illness. It is more than twice the value of the subsidy on flour for those who received the ration and about four times the average value of the subsidy received by the entire sample.

Rates of reported illness are greater among households whose expenditures per capita are more than Rs 250 a month than among those whose expenditures are lower. This is, of course, surprising, although it should be recalled that all households reside in the same low-income neighborhoods. Furthermore, reported deaths of children five years of


Table 12--Incidence of disease among children five years of age and under

<table>
<thead>
<tr>
<th>Gender</th>
<th>Diarrheal Disease</th>
<th>Other Illness</th>
<th>Either</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Round 1</td>
<td>Round 2</td>
<td>Round 1</td>
</tr>
<tr>
<td>Male</td>
<td>27.9</td>
<td>22.9</td>
<td>30.1</td>
</tr>
<tr>
<td>Female</td>
<td>28.7</td>
<td>20.7</td>
<td>22.7</td>
</tr>
<tr>
<td>Total</td>
<td>28.3</td>
<td>21.9</td>
<td>26.2</td>
</tr>
</tbody>
</table>


age or under are also more numerous for the higher expenditure groups within the sample.

One approach to investigating indexes of malnutrition further is to normalize the weight-for-height of each child by subtracting 50th percentile standard weight-for-height for the appropriate gender and age, according to WHO, and to divide by the standard deviation. These normalized variables are referred to as Z-scores. Equation 6 is an explanatory regression of such weight-for-height Z-scores.

\[
(6) \quad Z = -0.78 + 0.20 \text{Female} - 0.76 \text{Childshare} + 0.0033 \text{HHSize} \\
    - 0.024 \text{Age} + 0.00036 \text{Age}^2 + 0.006 \text{ExpCap} \\
    - 0.023 \text{ILL} - 0.027 \text{DDAYS} + 0.35 \text{NWFP} \\
    + 0.12 \text{Punjab} - 0.001 \text{Baluch} - 0.22 \text{Round 1}, \\
    \text{HHSize} = 935; R^2 = 0.05,
\]

where

- \text{Age} = \text{the child's age in months},
- \text{ExpCap} = \text{household daily expenditures per capita},
- \text{ILL} = 1 \text{if the child had a nondiarrheal disease in the previous two weeks, and}
DDAYS = the number of days of diarrheal disease during the last two weeks.

The low $R^2$ of such a regression should not surprise anyone familiar with modeling child growth or size. The equation can easily be reformulated in terms of the child's weight rather than Z-score, which will give an $R^2$ of 0.7, with age having a t-value of 20. Such a reformulation reveals only that older children are bigger. It furthermore masks the age-related pattern of malnutrition reported here; Z-scores—and hence nutritional status—decline until the age of 33 months, then increase, at least for the survivors.

Recent diarrheal disease significantly reduces the child’s weight-for-height. Other illnesses also have negative effects, but the apparent effect is not significant. Variables for full bottle feeding before weaning as well as mother’s education proved insignificant in earlier versions of the regression. The number of siblings five years of age or under has a detrimental effect on a child’s nutritional status, as indicated by the variable childshare. This confirms the often observed advantage of child spacing. One observation that was not expected is that there is less short-term malnutrition among young girls than among boys, when age and illness have been controlled for. This differs from general observations in South Asia, and should be confirmed with other data.79

An increase in family expenditures leads to better nutrition, although it is not possible to distinguish the direct effect of family income from the indirect effects working through increased family food intake. While a variable for predicted calories estimated using a simultaneous estimation technique has a positive and significant effect in some, but not all, specifications, the data do not carry enough information on prices to identify a calorie effect that is not roughly a linear combination of expenditures and other variables included in Equation 6.80

Probit regressions to explain morbidity indicate a highly significant decline in the incidence of disease with age—pertaining to both diarrheal and nondiarrheal disease—and a higher prevalence of non-


80 The reader familiar with econometric techniques may wonder why a simultaneous procedure was employed in the case of calories, but not in the case of illness. While illness is endogenous, given the poor predictive power of any equation explaining its occurrence, achieving unbiased estimators by including a prediction of illness is done only at a sacrifice of information, hence efficiency. The trade-off is difficult to quantify, but it is real.
diarrheal illness in the Sind as well as a decrease in the probability of illness in children whose mothers have had some degree of formal education. The absence of a significant difference in morbidity for girls as well as the absence of a significant effect of total expenditures on the probability of illness are both observations useful for policy design if they can be confirmed in more detailed studies. The latter observation is in keeping with the higher rate of infant mortality observed in Pakistan than in neighboring countries and is discussed by Sathar.81

CHOICE OF HEALTH SERVICES

Given the interaction of illness and nutritional status confirmed in Equation 6, it is useful to consider the availability and use of health care infrastructure. Households appear to have preferences for using health services that differ from the prevalence of these alternative forms of health care (see Table 13). Maternal child health centers (zatcha batcha), for example, were available to a third of the households, although they were virtually never visited, either for health care or to obtain food that was provided by the WFP. Households rarely took their children to government clinics or to hospitals, although private doctors were visited regularly.82 There are no apparent differences in use according to type of childhood illness or by gender. Similarly, the number of boys who received oral rehydration salts was only slightly larger than the number of girls; the overall rate of use was 43 percent of all children who had diarrhea. Vaccination rates do not differ markedly by gender; 70 percent of boys five years of age and under had received at least one vaccination while 67 percent of girls had done so.

While there are major differences in expenditures by type of provider, few systematic patterns were observed. There were no significant differences in the cost of medical services in the various provinces, nor were there differences between the cost of care given to boys and that given to girls. Private doctors, however, were more expensive than government clinics, yet were used more. This may reflect a perception that private doctors provide a higher quality of service as well as the lesser availability of the dispensaries. The inclusion of expenditure in a regression with health costs as a dependent variable is not a preferred approach for modeling the choice of


82 The average number of visits to dispensaries and private doctors is heavily influenced by a few adults who require daily visits to these centers. Data on visits by children were collected individually by child.
Table 13--Availability and use of health care

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>Percentage of Households Reporting Service Locally Available</th>
<th>Average Number of Visits in Previous Month (If Available)</th>
<th>Total Number of Visits for Diarrheal Disease in Last Two Weeks</th>
<th>Average Cost</th>
<th>Total Number of Visits for Other Illness in Last Two Weeks</th>
<th>Average Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dai or Siani</td>
<td>79.4</td>
<td>0.13</td>
<td>7</td>
<td>2.0</td>
<td>4</td>
<td>14.0</td>
</tr>
<tr>
<td>Hakim or homeopath</td>
<td>33.8</td>
<td>0.66</td>
<td>9</td>
<td>2.2</td>
<td>13</td>
<td>13.5</td>
</tr>
<tr>
<td>Chemist or compounder</td>
<td>76.8</td>
<td>1.46</td>
<td>51</td>
<td>25.4</td>
<td>35</td>
<td>22.9</td>
</tr>
<tr>
<td>Government dispensary</td>
<td>41.1</td>
<td>2.36</td>
<td>8</td>
<td>19.0</td>
<td>3</td>
<td>27.3</td>
</tr>
<tr>
<td>Private doctor</td>
<td>87.6</td>
<td>3.77</td>
<td>142</td>
<td>35.3</td>
<td>164</td>
<td>37.3</td>
</tr>
<tr>
<td>Hospital</td>
<td>88.1</td>
<td>0.64</td>
<td>20</td>
<td>12.15</td>
<td>18</td>
<td>14.3</td>
</tr>
<tr>
<td>Maternal child health clinic</td>
<td>36.3</td>
<td>0.08</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>


Notes: A dai is a midwife and siani is an herbalist. Hakim is the traditional practitioner of healing arts.
Nevertheless, such a variation was explored in order to verify that the cost—and the quality—does increase with income.

TARGETING SOCIAL WELFARE PROGRAMS

Both the former ration system and the current pricing policies are examples of subsidies that are not targeted on the basis of need. This reflects the origin of the program as a general scheme to allocate scarce commodities. Only later did it take on the goal of poverty alleviation. The latter goal, however, is more effectively met when a program is limited to subgroups whose need is thought to be the greatest. Such programs require additional, often scarce, administrative resources. Thus, they may increase the cost per recipient, while at the same time reducing the total cost to the government.84

One means of confining a program to the groups whose need is greatest is geographic targeting, in which services or subsidies are made available in certain neighborhoods and not others. Note that the present policy of a uniform release price for wheat in all provinces is a form of geographic targeting of transportation subsidies that benefits the Northern Areas as well as the NWFP and Baluchistan. Other potential forms of geographic targeting relevant to Pakistan include the selective siting of WFP food distribution centers—zatca batcha centers—explicitly in the poorest neighborhoods. This does not appear to be a current practice. Although utility stores are not subsidized, they provide low-cost alternatives to other retail outlets, which currently are rarely located in the poorest neighborhoods. Plans are under way, however, to change the distributional bias. Similarly, if a partial wheat rationing system were to become necessary as the result of changes in the economic environment—and it must be stressed that there is not a strong case that such a program is needed at present—it would be advisable to limit the outlets for subsidized flour to katcha (dirt road) neighborhoods and similar concentrations of low-income families.

Such an approach to determination of the priorities for services does not require the setting up of an extensive administration unit nor does it require determination of the economic state of individual


84 More details on targeting of subsidies are presented in Pinstrup-Andersen, Consumer-Oriented Food Subsidies, and in Kennedy and Alderman, Comparative Analysis of Nutritional Effectiveness of Food Subsidies.
households; services may be provided to all residents of the neighbor-
hood. Geographic targeting does require, however, more up-to-date
information on the distribution of poverty and malnutrition than is
generally available. To be useful, an economic stratification of
neighborhoods would need to be updated periodically, since most urban
migrants are in need of services, yet are often less visible than long-
term residents. Conversely, low-income neighborhoods occasionally
change as development leads to the replacement of low-income residents
by better-off families, particularly as rural areas become suburbs.

Nevertheless, within any neighborhood, there are households of
various financial means. Thus, geographic targeting runs a risk both
of excluding needy families who reside in generally well-off areas and
of including prosperous families within less highly developed areas.
One way of overcoming this limitation, in principle, is the targeting
of programs by family means. Since a majority of workers in Pakistan
are self-employed, however, or are employed in the informal sector, any
program targeted on the basis of household income would have to rely on
self-reported income. If the benefits of a program are desired by the
general population—a food stamp program, for example—many middle-
income households may report their incomes as lower than they actually
are in order to be included in the program. Similarly, many poor
households employed in formal or public sectors may be excluded because
their incomes are more visible, even if modest.\(^85\)

The distribution of zakat in Pakistan is a program that is alloca-
ted on the basis of need and is therefore targeted to families.\(^86\) The
local councils use knowledge about the families' condition that is not
generally available to government agencies, although they are possibly
influenced by local political concerns as well. In the IFPRI-PIDE
survey, 44 households reported receiving zakat. While statistical
analysis indicated a significant negative relationship between the
household's income and the possibility of receiving zakat, the rela-
tionship is weak; 18 (41 percent) of the households receiving zakat
were in the upper 40 percent expenditure group—expenditures greater
than Rs 400 per capita a month. Larger households, moreover, or those
in which there were more young children, were less likely to receive
zakat, although their nutritional need is greatest.

Given the difficulty of targeting by income, targeting is often
achieved by the use of various proxies for economic status. Recipients

\(^{85}\) Both these forms of misclassification occurred with the Sri
Lanka food-stamp program. See Neville Edirisinghe, The Food Stamp
Scheme in Sri Lanka: Costs, Benefits, and Options for Modification,
Research Institute, 1987).

\(^{86}\) In the Islamic tradition, zakat is a percentage of assets that
is directed to charity.
are determined for a program on the basis of employment category, for example. This has the administrative advantage that service outlets can be set up, or benefits can be provided at the place of employment. The recent salary increase for government employees that was tied to rationing was such a program.

Similarly, some programs can be targeted, not by the inclusion of poor families, but by the exclusion of well-to-do families. In many countries sliding scales are used to charge progressively higher fees for services so that members of higher-income groups pay roughly the cost of the services, while others are subsidized. This approach is often used for the provision of health care. In one approach, full-cost recovery may be required only if a household owns more than a certain amount of land, or other assets—say, an automobile. While the problem of unreliable self-reporting is still present, to the degree that the program is presented as a welfare program rather than as a general right, this problem is reduced. Also, when eligibility or sliding scales are determined for repeat visits through an extended period, there is greater opportunity to verify self-reporting and there are more benefits from doing so than if the service is provided only once or occasionally.

An external assessment or verification of household income, however, is not necessary for all forms of targeting by family income. Self-targeting may be achieved when the perceived quality of a subsidized service or commodity is lower than that of what is available on the open market. Upper-income groups do not then seek the subsidized service. The former wheat ration system achieved such self-targeting; its inefficiency was not the result of the use of most of the benefits by upper-income groups, but rather by the release of subsidized flour on a scale consistent with widespread use, which encouraged illegal profits and diversion of supplies. It is not known whether a smaller scheme would have had as high a percentage of diversion. Similarly, to a fair degree, subsidized medical services are used mainly by lower-income households. It is not known, however, whether real differences in quality of services are correlated with popular notions and with prices actually paid or what, other than income, determines the type of medical care a household chooses.

Finally, targeting of services can be achieved on the basis of individual rather than household characteristics. Such programs are commonly earmarked for pregnant or lactating women and for infants. This, of course, is easily observed—providing the individuals are aware of the program and seek its benefits. Further targeting can be determined by weight and height of children, growth, or previous medical histories. This, however, is dependent on the availability of skilled health auxiliaries attached to the program. Maternal and child health programs for the distribution of subsidized foods as well as for the administration of health care do exist in Pakistan, but availability seems to be sporadic and occasionally they are not widely used.
even where they are present. If this is the result of lack of food resources rather than other administrative or image problems, there is a potential for some of the resources allocated to general food subsidies to be shifted to these health and nutrition centers.

**TARGETING EFFECTIVENESS OF THE FLOUR SUBSIDY**

If one presumes that the ration flour policy has evolved into an income support program, one measure of the effectiveness of the system is the percentage of total transfers received by the poorest families. Such an exercise can be instructive, but only if it is recognized that it can indicate relative, not absolute, values. An absolute measure of efficiency requires information on the actual intended target group as well as an estimate of the costs of the bureaucracy in the Food Department. For the comparison between 1986 and postderationing income transfers, it is sufficient to define the target group arbitrarily as the poorest third of the urban population.

Were consumption of ration flour determined by the factors modeled in Equations 1 and 2 without leakage, 48 percent of all flour subsidies available for the urban population would go to the poorest third. Conversely, under the current system only 21.7 percent of total subsidies go to the poorest third. This is calculated using an income elasticity of 0.3, and recognizing that subsidies are directly in proportion to the quantity consumed under the current system.

However, a proper comparison should allow for the fact that while the urban poor received a disproportionate share of the ration flour that actually reached consumers through the depots, much of the subsidy never reached consumers. If leakage was 60 percent, as estimated above, the urban poor received roughly 19 percent of the total outlay. Under this assumption, then, the present system is similar to the former system in terms of percentage of the subsidy reaching the poor.

This exercise is a function of the income elasticity for flour consumption and would be similar if the storage subsidy were reduced. If the government were to subsidize part of the storage costs instead of all, the urban poor, as arbitrarily defined here, would receive roughly 22 percent of the reduced total subsidy.

Under a geographically targeted ration system, in which the poorest third of urban neighborhoods had a ration system, the percentage of the subsidy that reached the poor would depend on both the percentage diverted from the system and the percentage of the poor not living in low-income neighborhoods and of nonpoor living in low-income neighborhoods. Even if diversion is not diminished with geographic targeting,

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87 Only three households in the IFPRI-PIDE survey obtained such subsidized foods.
the percentage of subsidies received by the poor is likely to be higher than under the current system.

Note, however, that since services are less easily diverted than are commodities, the effectiveness of subsidizing services and targeting them geographically is likely to exceed the effectiveness of targeting commodities geographically.
5. THE IMPLICATIONS OF DERATIONING

FISCAL COSTS

The estimated cost of subsidies on wheat for 1987/88 presented in Chapter 2 was Rs 2.21 billion, including the increment in government salaries tied to derationing. This estimate is based on three assumptions: that 0.3 million low-level government employees would each receive an additional Rs 20 a month, that the storage and handling subsidy would cost Rs 520 a ton, and that a total of 4.13 million tons would be subsidized including the allocation to Azad Kashmir, the Northern Areas, and the military. An additional assumption that the transport of 1 million tons of grain to the NWFP and Baluchistan will be subsidized with Rs 350 a ton adds Rs 0.35 billion to the estimate.

The first assumption, representing a single increment to salaries timed to coincide with derationing, is a cost that should not change in nominal terms and should decline in real terms in the future. The other components of the costs are more sensitive to changes in the economic environment. The wheat-marketing policies that replace the system of partial provisioning of flour, moreover, may have increased the sensitivity of the subsidy to such changes.

When the government determines both a procurement price and a release price, it is clear that any increase in one of these administered prices without a corresponding increase in the other would influence the government's subsidy bill—or, in principle, profits. This pertains to any administered set of prices, such as the former ration system, as well as to the present generalized subsidy. The main difference, however, is that under partial provisioning the retail price was determined administratively for only a portion of the total marketed quantity—that is, it formerly controlled quantity as well as prices. Relinquishing control of the former not only directly limits the ability of the government to control the subsidy bill, it changes the political process of price formation.

While an increase in the ration price in the past merely narrowed the gap between the price of flour of that quality and the price of other types of flour whose prices appeared to be unaffected by the announced change, a change in the release price will now change the price to the entire population. Under similar conditions, many other governments have proven reluctant to change administered prices of food staples when inflation, a return to a position of wheat importing,
or other changes in market conditions entail growing subsidies. It is, of course, also possible that unit subsidies may decline, particularly considering that current storage and handling charges are on bagged grain rather than bulk and therefore that there is scope for gains in efficiency. The risk of growing subsidies, however, should be a matter of concern.

The subsidy bill should also grow in keeping with the growth in volume. This is assured by the population growth as well as the positive—albeit small—income elasticity for flour. Urbanization may also influence the volume of wheat that the government subsidizes. As will be seen, moreover, it is likely that in the long run a government policy of absorbing the costs of storage and transport will influence rural marketing patterns. If the general subsidy induces more rural households to rely on marketed flour, the volume of grain handled and subsidized by the government may increase greatly. There is now no mechanism to forestall this possibility.

**IMPLICATION FOR MARKETING CHANNELS**

As originally designed, the present system offered a voluntary procurement price of Rs 2 a kilo and a release price at the same level. As wheat is released in bags of 100 kilos, the bag itself having a value of approximately Rs 10-15, it would have been profitable to purchase wheat released at Rs 2 and resell it to the procurement center, keeping the bag to resell elsewhere. To avoid this possibility, without appearing to raise the release price, the government added an additional charge of Rs 8 per bag. This led to slightly higher retail prices than originally anticipated and therefore lower fiscal costs.

An alternative approach might have been to institute a policy in which wheat is procured in different months from those during which it is released. In the past the bulk of all procurement has occurred during the postharvest months, even when it has been possible during


89 A similar policy in Indonesia has stimulated production, but at great cost to the logistics agency. See C. P. Timmer, "Food Price Policy in Indonesia," Harvard University, Cambridge, Massachusetts, December 1986 (mimeographed).
the entire year, so this would have had little effect on procurement. There are potential administrative difficulties in this approach, however. It may still be profitable to purchase government releases shortly before their suspension during the procurement season, store the wheat for a few weeks, then sell it back to the government when procurement begins. If sales are suspended sufficiently long before procurement to discourage such recycling, however, there is risk of a seasonal shortage of supply with attendant price rises.

The need to consider such timing of sales and procurement to avoid recycling stems from the insufficient margin between purchase prices and sale prices, and it was avoided by increasing the release price plus bags. The margin, however, remains sufficiently narrow that there is no incentive for private storage of wheat. No wholesaler or retailer would find it profitable to bag, fumigate, or store grain, when the postharvest price of wheat was identical to the harvest price for grain plus the price of a secondhand bag. Retailers will find it costless to let the government bear the handling and interest charges. Similarly, while in the past a portion of the wheat produced for marketing has been held on the farm for subsequent sale, farmers will be disinclined to continue this practice. If producers come to expect that the government will bear storage costs, moreover, they may increase the amount they sell to procurement centers and buy it back at a later date. Of course, the economic rationality of this behavior would depend on the farmer’s marginal costs of transport to the procurement center as well as the costs between the point of release and the farm. The net effect of such a change in incentives would be an increase in the volume of procurement, which would increase the total cost and would furthermore require the government to increase storage capacity or suffer more losses on account of inadequate facilities.

While the main concern for the increased volume that the government would handle is the proportional increase in the subsidy bill, an attendant issue is the increase in losses to be expected if procurement levels surpassed the government’s ability to store the grain. With installed storage capacity of 4.4 million tons (1986) and a desired pipeline or security stock of 1 million tons, there is little room for a procurement level that exceeds the predicted annual releases. While the storage crisis in the spring of 1987 was in part a product of the

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90 For example, 92 percent of all procurement in the Punjab occurred during May and June in 1985. Similarly, 93 percent of procurement in Sind occurred during April and May, according to data provided by the Ministry of Food, Agriculture, and Cooperatives.

crop damage at harvest time, with carryover stocks of 2.1 million tons from the previous year, substantial losses would have been suffered even with normal weather. The problem of inadequate storage is made more serious by any policies that discourage on-farm or private sector storage. It is also made worse by an unrealistic no-loss management policy that encourages the mixing of damaged grain with other wheat. While a similar problem of poor-quality flour from mills has been reduced by the derationing, it is not yet certain that the problem does not persist in the storage centers.

OPTIONS TO REDUCE COSTS AND THE GOVERNMENT'S SHARE OF STORAGE

Without modification of the current policies for wheat pricing, the subsidy bill will grow at least as fast as the population. Quite plausibly, it will grow at a rate much faster than this. This growth appears to be unplanned; that is, it is a by-product of the process by which flour was derationed, not an explicit goal of the government. Various measures can be considered that may reduce the subsidy bill. It should be noted that not all measures that would reduce the subsidy bill would also promote trade in the private sector.

In principle, the government can shift whatever proportion of storage it deems optimal back to private merchants and farm households by increasing the release price. If the margin between procurement and release is less than annual storage costs yet greater than the costs of handling and bagging wheat, the private sector will store for a portion of the year. The greater the margin the longer the period during which private storage is profitable and the shorter the period during which merchants will find it profitable to obtain releases from government stocks. If the margin is increased throughout a number of years, both private traders and mill owners may invest in storage facilities in order to reduce their costs during the postharvest period. Competitive pressures, plus the price ceiling imposed by the government release price, will keep the storage markup in line with the real costs of storage.

The present policy of procurement and release prices is illustrated in Figure 1a, while a policy to encourage private storage is illustrated in Figure 1b. In the former, the procurement price \( P_p \) is the same as the release price \( P_r \) throughout the year. Assume that private traders purchase wheat at harvest time at a price close to the procurement price and that storage costs are in proportion to time. The dotted line \( P_p \) \( P_s \) then represents their costs and hence the minimum price at which they can profitably sell. Since this price is everywhere greater than \( P_r \), there will be no private storage.

In Figure 1b, \( P_r \) is greater than \( P_p \) and until time \( t^* \) the cost to millers or grain merchants is less than the release price. Until time \( t^* \) millers would prefer wheat they have stored over more expensive grain at price \( P_r \). Similarly, merchants will profitably increase the
Figure 1--Alternative wheat-pricing policies

1a

\[ \text{PRICE} \]

\[ P_p \]

\[ t_o \]

\[ \text{TIME} \]

1b

\[ \text{PRICE} \]

\[ P_p \]

\[ P_r \]

\[ t_o \]

\[ \text{TIME} \]

1c

\[ \text{PRICE} \]

\[ P_p \]

\[ P_r \]

\[ t_o \]

\[ \text{TIME} \]
volume of their trade by selling at a price less than \( P_r \). Similarly, farmers can profitably store wheat and sell it before \( t^* \). Clearly the higher the release price, the greater the time interval between \( t_0 \) and \( t^* \) and the lower the share of total stocks that the government must hold. An increase in the release price, then, reduces subsidies in two ways: it reduces the quantity to be subsidized and it also reduces the unit subsidy. When \( P_r \) is equal to the price of storage for an entire year, storage subsidies will have been eliminated and the government need hold only a buffer stock for the purpose of interyear stabilization of supply.

The situation would, of course, be more complicated if the government were to allow official release prices to rise between harvests. Such a policy would recover some or all of the costs of storage and would thereby also reduce both fiscal cost and consumer surplus. If such a seasonal price pattern still contained a subsidy, however, the issue of incentives to private traders would remain a concern. Depending on relative efficiency of storage and the degree of subsidies, it is possible that such a reduction in cost would not also promote private trade.

This is illustrated in Figure 1c. In this diagram the release price rises each month, but because of subsidies on storage—including, but not limited to, subsidies on interest—the release price does not rise as fast as do private costs. At no time are private merchants able to store grain profitably. Nevertheless, the government reduces its costs, saving in each month an amount equal to the difference between \( P_r \) and \( P_p \) times the releases during that month.

Clearly various combinations of lb and lc are possible. If the private storage capacity is less than necessary for handling the marketed quantity throughout an entire year—as it surely will be for the foreseeable future—stepped increases in release prices can begin at a price sufficient to encourage full use of private storage capacity and rise gradually through the year to reduce the government's subsidy on the portion of wheat it must handle.

The government can also shift storage to the private sector—in this case, to farmers—by considering a policy of stepped increases in procurement prices. If the procurement price is Rs 2 a kilo in April through June and somewhat higher later in the year, some farm households will choose to delay their sales. While such a policy has the potential of solving logistical problems in storage, it does not by itself reduce the volume of grain subsidized or the subsidy per unit; whether storage costs are paid to farmers or to PASSCO, they are real costs, which under current pricing policies are borne by the government rather than by consumers. Some savings may be realized if farmers are more efficient at storage than the public sector, and there may be some gains in welfare from having this service performed in rural areas, but these issues are secondary considerations for derationing.
Note that a stepped procurement price differs greatly from an ill-advised policy of procurement quota, which would reduce the percentage of the harvest handled by the government, but only at the expense of undermining the confidence of producers in support prices. Quotas on procurement generally lead to marginal producer prices that are below the stated floor price. Savings on subsidies, then, that came from reduced procurement would entail lesser incentives to producers and would reduce production in the long run.

Another issue for consideration is the consequences of the current interprovincial transport subsidies. This provision for release prices that do not vary by province has obvious and defensible political value. It also has a fiscal cost of Rs 300-400 million a year as well as economic costs in disincentives to private trade. If wheat is released from government stocks at Rs 2,000 a ton in the NWFP, there will be no reason for a miller or grain merchant in that province to purchase wheat at Rs 2,000 in the Punjab. Since there are real costs of transporting wheat between provinces and no indication that the private sector is inefficient or uncompetitive in the transport of grain, the policy of uniform national pricing, while superficially an equitable one, is in fact a policy that gives larger unit subsidies to more remote, wheat-deficit areas. While this, of course, may conform to national welfare goals, it is not apparently compatible with another stated goal, that of an active private sector.

Furthermore, since the policy announced in February 1987 pertains to the release of wheat, a single nationwide release price will aggravate the problem of excess capacity in milling. Before the new policy, a portion of the flour consumed in the NWFP was milled in the Punjab. With no price difference in wheat between the two provinces, interprovincial trade in flour will not be profitable. Neither will trade between surplus and deficit areas within a province. Consequently, larger mills built in wheat-surplus areas will lose their advantage over smaller--and possibly less efficient--mills dispersed throughout the country.

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92 While the postharvest crop damage in 1987 represents special conditions, the refusal by some procurement centers to purchase damaged grain depressed private market prices. Some producers complain that this affected prices of undamaged grain as well.

93 Cornelisse and Naqvi, in *The Wheat Marketing Activity in Pakistan*, indicate that installed capacity of modern mills in 1980--excluding village units--was more than twice the total consumption of flour in 1983. Excess capacity was greatest in the Punjab.
6. SUMMARY AND RECOMMENDATIONS

The basic conclusions of the study can be summarized as follows:

1. The cost of the ration system as a percentage of current government expenditures declined appreciably between 1973 and 1986, beginning that period at more than 13 percent of current expenditures and reaching a low of only 1.7 percent in 1983/84. During the two subsequent years the costs increased to 3.1 percent of current expenditures, indicating the sensitivity of the program to crop production conditions.

2. The concern with the former ration system was not, however, over any observed agricultural disincentives or effects on inflation or foreign exchange rates, but over its apparent inefficiency. While 3.1 million tons of subsidized wheat were released by MINFA in 1985/86, between 64 and 72 percent of that wheat was not drawn by consumers in the form of subsidized flour in the ration depots or indirectly through the subsidy on nan (bread) in the NWFP.

3. The use of ration flour that can be accounted for is based on a series of household surveys that indicate a decline in use between 1977 and 1982 and a further decline by 1986. In 1986 only 19 percent of the urban population and 5 percent of the rural population purchased ration flour, but the difference between purchases in rural areas and those in urban areas reflected differences in the availability of ration flour rather than differences in consumer preferences. Urban households that used the ration used 60 kilos a month, while rural families used approximately 30 kilos a month. This accounts for 828,000 tons annually. In addition, 120,000 tons of subsidized flour were provided to bakers in the NWFP.

4. Use of the ration system was greater among low-income groups, indicating self-selection. This was observed in three surveys in 1986, as well as in surveys during 1977, 1981, and 1982. While 32 percent of urban households with monthly incomes of less than Rs 500 in 1986, for example, used the ration system, only 15 percent of households whose incomes were higher than Rs 2,000 did so.

5. Derationing that took place in April 1987 removed a partially targeted but inefficient subsidy and instituted a general subsidy on wheat. The projected effect of this form of derationing is a net saving of only 20 percent of the subsidy bill that would have been incurred in 1987/88 in the absence of derationing. Since wheat is released at the same price as that at which it is procured, the current
subsidy consists largely of the cost of handling and storage. Only part of this is recovered with a charge of 8 paisa per kilo for bags. The net subsidy is approximately Rs 520 a ton. In addition, transport subsidies on grain shipped to the NWFP add another Rs 350 a ton in that region. Furthermore, since derationing included a wage increase for low-paid government employees, an additional Rs 72 million a year must be considered a price of derationing.

6. While the derationing will bring only modest savings for 1987/88, the cost represents an overall increase in consumer welfare and a reduction of unauthorized profits that accrued under the old system. For the general population the cost of flour declined. Households that did not formerly use the ration system will have a general increase in consumer surplus—a measure of consumer welfare—of Rs 22.5 a month, while former users of the ration system will have a decline in consumer surplus of Rs 17.5. This is slightly less than the increase in the wages of government employees.

7. Another way of looking at the effect of derationing on consumers is to consider the percentage increase in the cost of living. This would be 1.15 percent for the average urban ration user, but 1.7 percent for the poorest third of that population. If the general subsidy on all wheat were removed and transportation, handling, and storage costs were thereby passed on to consumers, the cost of living of the poorest third of the population would increase 4.2 percent.

8. Initially, derationing does not entail sufficient costs to the urban population to warrant a targeted or limited alternative program aimed at the hardest-hit consumers. Not only are the administrative costs necessary to target such a program likely to outweigh the benefits, a partial ration system risks encouraging pressures to reinstate the former system, with its attendant inefficiencies.

9. There is no need for special programs to compensate former ration shop owners, moreover, over and above the loan provisions now offered. Not only do official records indicate far fewer registered depots than claimed by the shop owners' representatives, the official figures are most likely to have been overstated, for they fail to indicate a decline in the number of depots following the derationing of sugar. More to the point is the fact that the total volume of trade in wheat will not decline because of derationing, hence the total value added in marketing should not decline. Former owners of ration shops are free to compete for a share of this retail market; if they are competitive, as they are likely to be if their handling charges are similar to those allowed under the ration system, they will retain and perhaps even expand their customer base. If they are not competitive, there is no reason the government should favor them over other retailers.

10. While the present number and distribution of utility stores is such that most low-income consumers do not have easy access to them,
an expansion of the network to include mobile units might fulfill the function of providing a retail price floor. The shops, however, should not be subsidized. Otherwise, an unplanned return to a de facto ration system may ensue. The main price floor, however, comes from competition among merchants and among millers. This is expected to influence quality as well, since merchants are not tied to a particular miller the way holders of ration depots were. If a mill does not provide flour of good quality, the customers can, in many regions, shift their source of supply.

11. The present pricing policy has three stated goals: constant seasonal prices, uniform prices throughout the country, and an active private sector. To a large degree the first two goals are incompatible with the third. Present policies leave little function for the private sector in storage or transport. They discourage farm households from storing grain on the farm, moreover. In the long run, this will lead to handling of an increasing share of total output by the government and an increase in the total subsidy bill, probably exceeding the costs of the former ration system.

12. Since transportation charges to the NWFP and Baluchistan are higher, the current panterritorial pricing policy, under which the release price does not vary, while it has obvious political appeal, represents a higher unit subsidy in those provinces than elsewhere. Such a policy exacerbates the excess capacity in milling. It also adds another Rs 300-400 million to the subsidy bill.

13. Increases in the release price in the course of the agricultural year will allow the government to recover some of its storage costs. It is possible, however, that such a seasonal policy will not allow the private sector to undertake storage profitably. This depends on the degree of subsidy of storage and the timing of stepped price increases. An alternative approach of a constant margin between procurement prices and release prices will both reduce the government share of total marketing costs and the subsidy bill per ton handled. The government should strongly consider a regular annual increase in the margin between procurement prices and release prices until the subsidy is virtually eliminated. Since a number of social conditions influence the optional timetable for such a reduction, it should be recognized that it may not be possible to eliminate the storage and transport subsidy immediately. The private sector is, in any case, unable to increase storage capacity immediately. A clear signal, however, is necessary if the government desires to encourage investment in wheat handling by this sector.

14. Whereas a seasonal rise in procurement prices will encourage farmers to store a portion of their production during the postharvest period, such a policy by itself will do little to reduce the subsidy bill. With no change in release prices, such a policy merely transfers to the private sector the payment that would have gone to the storage
by the public sector. This may achieve distributional goals but does not reduce costs appreciably.

15. While there is little economic rationale for maintaining the subsidy for transport costs or interseasonal storage costs, a relatively small subsidy may be necessary to maintain a capacity to intervene in times of acute shortage. This objective differs from those of private traders and involves the costs of maintaining and rotating interyear buffer stocks that may be borne by the government. To be efficient, there must be leeway to increase or decrease such stocks according to world prices, domestic supply and demand, and the timing of the agricultural cycle. This is a subject for further research.

16. Derationing does not add appreciably to the problem of urban poverty. Nevertheless, it is also true that according to a variety of welfare measures poverty is widespread in urban areas. This is indicated by a number of studies on child mortality rates and the incidence of disease and malnutrition, including the present report. While an expected negative relationship between malnutrition and income was found in this study, as well as a strong relationship between income and calorie consumption (the income elasticity of the sample mean is 0.22), the incidence of childhood disease did not decline with household expenditures. Nor did it differ by gender.

17. The infrastructure necessary to target poverty programs on the basis of family need is largely lacking in Pakistan. Given the moderate effect of derationing, it is not suggested that either an income-targeted ration program or food stamp scheme is advisable. Some consideration should be given, however, to targeting poverty alleviation and health programs more accurately, either on the basis of neighborhood or individual characteristics. To this end, up-to-date information on malnutrition, illness, and the distribution of income should be compiled using recent surveys of the Federal Bureau of Statistics, the Census Bureau, and the National Institute of Health. Priorities for the provision of health services, including the distribution of food by the World Food Programme, and the siting of utility stores, can then be established using neighborhood poverty profiles. Similarly, consideration should be given to allocation of a portion of the savings from the reduction of subsidies during the next few years toward expanding health services for mothers and children to reduce the high levels of mortality. While general food subsidies support family welfare, more health programs for children can be substituted efficiently toward other nutrition-related social goals.
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Harold Alderman and Marito Garcia are research fellows at the International Food Policy Research Institute. M. Ghaffar Chaudhry is chief of research at the Pakistan Institute of Development Economics.