

PROTECTION VERSUS UNDERPRICING OF AGRICULTURE IN THE DEVELOPING COUNTRIES: A CASE STUDY OF INDIA

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I. PROBLEM SETTING AND SCOPE

WHEREAS strong protection and price support for agriculture with few exceptions have gone on at an increasing pace in the developed world since the 1950s [7] [8], developing countries have come in for sharp criticism for the policy-mix they pursue supposedly to "exploit or tax" domestic agriculture in favor of their purported goals of industrialization, growth, and equity [18] [12] [13]. India has frequently been chosen as an illustration to demonstrate ostensibly how a wrong set of policy choices have retarded agricultural growth or have constrained the realization of potential growth. Without going into the reasons adduced for such policy choices, the major burden of this failure has been placed on market interventions of one kind or another, public procurement of agriculture products at lower than market prices, restrictions on exports, export taxes, and overvalued exchange rates. The effect of all this is denoted by the broad phrase, "underpricing of agriculture." Such underpricing in the developing countries, in turn leads to distortion of farmer incentives and damages the prospects for realizing the full potential growth of agriculture [11]. This is reflected in domestic prices being lower than the world market prices of agricultural commodities and in the corresponding negative Nominal Rates of Protection (NRP), the magnitudes of which, at the time, indicate the degree of "exploitation/taxation" to which agricultural producers are subjected in the developing countries. The major assumption behind this characterization is that had free foreign trade been allowed, producers would have reaped higher benefits by selling their products at higher than domestic prices. Serving the same purpose, simple proportional measure, namely, the ratio of domestic to import prices, called the Nominal Protection Coefficient (NPC), has been used in World Bank studies [4] [1]. The two are obviously related and in the

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situation of taxation/exploitation, when import prices are higher than domestic prices, the NPC is less than one and the NRP is less than zero and negative.

Undoubtedly, "underpricing of agriculture" does not tell us the whole truth regarding exploitation/taxation of agriculture, whichever of the two may be its indicative measure, confined as these are to comparison of product prices alone. Indeed, these indices, under certain circumstances, can be misrepresentative of the real situation as we shall see in the last section of this paper. The real situation is indicated, admittedly, by the Effective Rate of Protection (ERP), in order to arrive at which the domestic market prices need to be adjusted for public costs of production incurred in the form of direct subsidies to the producers or through subsidized input prices. However, nonavailability or difficulty of building data on direct and indirect public subsidies makes ERP estimation a time-consuming and difficult task. In contrast to this, estimation of NRP or NPC is easier due to ready availability of data on prices of traded agricultural commodities. It is not surprising, therefore, that most of the literature on agricultural protection, including the present paper, is based on NRP estimates. Since NRP estimates crucially depend upon one's choice of domestic prices and exchange rates they are amenable to biases. For the sake of clarity, therefore, a few observations of a general nature are in order. In the process we will also be commenting on some studies relating to India.

Ideally, for any traded commodity the unit c.i.f. and f.o.b. values at port should stand for the proper choice for estimating NRP. However, while c.i.f. values are easy to obtain, f.o.b. are not, particularly if the country in consideration is not an exporter of the commodity in question. If, in place of f.o.b. unit values, one were to use domestic wholesale market prices or the producer prices even when the latter are adjusted for the transport costs to port, one would be introducing a measure of bias. In either situation, the difference between the domestic and the international prices gets exaggerated. In the first situation, preshipment storage and transport costs to port fail to be included and these could be very substantial for a country of India's size with dispersed producing areas and long transport distances.¹ In the second situation, even when the cost of transport to port has been included [4], preshipment storage and marketing margins fail to be included, although somebody in the society must bear these costs, be it a government agency, private traders, or a marketing cooperative of the producers themselves. Admittedly, when the focus of study is international comparison of protection levels, the underestimation of the rate of nominal protection caused by the choice of producer prices need not alter the relative positions of the countries under comparison [7]. However, it must be clearly understood that

¹ The contention of "underpricing of agriculture" is further bolstered up if one prefers to select wholesale prices from one or two marketing centers in the areas of relative production concentration, for instance, Sambalpur in Orissa for rice and Moga in Punjab for wheat where prices are invariably lower than elsewhere [18]. The bias in favor of underpricing gets further compounded when such selective wholesale market center prices of an importing country like India are compared boldly with the domestic wholesale prices of an exporting country like the United States [13].

the choice of any set of domestic prices as a proxy for unit f.o.b. values will introduce a measure of bias in the NRP estimates.

There is another set of issues relating to the choice of prices. In a developing country like India there are more than one set of producer prices. Besides selling at procurement prices, farmers with different volumes of marketable surplus and with varying resource means and capabilities are found to sell at different market levels—at the farm-gate or village level to local, itinerant merchants; at the periodically held village markets; at subdivisional regulated or unregulated *mandis* (“market”); and finally at district headquarters and wholesale assembling markets. Then the large farmers who can hold back sell sizable proportions of their marketable surplus during the off-seasons at higher than harvest-time prices. A cursory look at the seasonal arrivals of various grains at the wholesale assembling markets from the villages in different states of India makes this quite clear [9, pp. 51–52]. In view of such complexity compared to the wholesale market price, it is far more difficult to arrive at an aggregate figure of the producer price of any tradable agricultural commodity which is adequately representative of the country as a whole, not to mention the problem of adjustment for transport cost to port which involves was another set of aggregations. Secondly, it makes obvious the fact that farm-gate, harvest prices underestimate the unit value of annual sales received by the producers.²

The second source of bias, as noted earlier, arises from the choice of exchange rate for purposes of NRP estimation. It is widely accepted that exchange rates in developing countries are overvalued. Adjustment for overvaluation of official exchange rates calls for reliable equilibrium exchange rate estimates for the developing countries, which are hard to come by [1]. Even if available, they are based on partial equilibrium models of the foreign trade sector alone and do not adequately reflect the scarcity value of foreign exchange, particularly for a developing country like India with increasing import demand for capital goods and raw materials and with inadequate and sluggish export surplus. Economywide multisector programming models inclusive of the foreign trade sector provide better alternatives for turning out the equilibrium exchange rate, though no approach is free from limitations [2]. A rough and ready guide is provided by the Effective Rate of Protection for the industrial sector and also the Domestic Resource Cost (DRC) per unit of foreign exchange earned or saved as a measure of overvaluation of the official exchange rate. During the 1960s and the early 1970s, a number of studies adopting these different approaches came up with estimates of the shadow or accounting price of foreign exchange for India in the range of 1.20 to 1.33 [3]. Our own estimate of the equilibrium exchange rate with most reasonable estimates of the average tariff rate, balance of deficit on trade account and elasticities of demand and supply of exports and imports

² The effect of weather on prices via its effect on annual production would require further averaging of these prices, perhaps three-year averages centered around the years chosen for the present study. We do not, however, expect the pattern of NRP values to change significantly due to this correction. This is because, except for the year 1965 when India suffered from severe drought, the years chosen for study were normal years.

covering the period 1966–67 to 1970–71 was 20 per cent higher (rupee to dollar) than the official exchange rate [14, Appendix III].³ In the light of these estimates, for purposes of project evaluation studies and in the Indian government's planning practice, a 33 per cent premium over the official exchange rate has generally been applied to foreign exchange costs and earnings of prospective projects for purposes of their selection according to cost benefit criteria. With the pre-oil-crisis base of 1972–73 the "real effective exchange rate" for India generally depreciated and the average index for the period 1975–80 stood at 76.8. This was the lowest among the developing countries, with the exception of Sri Lanka, and thus placed India with least distortion in the exchange rate [1] during this period. In the light of this, a conversion factor of 0.80 has been, perhaps rightly, applied to account for the overvaluation of India's official exchange rate for the late 1970s [4].

The rationale for using the "market exchange rate" for purposes of showing "underpricing" due to overvaluation of the official exchange rate [18] is neither clear nor justified. Serious limitations from which such a rate suffers have already been noted in the project evaluation literature [6]. Firstly, if the reference is to

³ The equilibrium exchange rate is the one that would balance the supply and demand of foreign exchange under conditions of free trade. Following Edmar Bacha and Lance Taylor [2], the equilibrium exchange rate r^* is given by

$$r^* = r t^{1/(1-q)},$$

where r is the official exchange rate, t is the effect of tariff (i.e., 1 plus tariff rate) and

$$q = [D(1+a) b (d-c)] / [(1+d) c (a-b)],$$

where D is the balance of trade deficit in ratio terms, and a , b , c , and d , respectively are price elasticities of export demand and supply and of import demand and supply. The term $1/(1-q)$ in this way reflects the effects of price elasticities of a country's imports and exports.

For the period 1966–67 to 1970–71 our estimates of the parameters enabling determination of r^* for India were as follows: $r=7.5$ (Rs. to dollar); $a=-2.0$; $b=2.3$; $c=-2.0$; $d=\infty$; $D=0.8$; $t=1.25$.

The average tariff rate, that is the ratio of import duties to imports, was 0.25 which gave us the value of $t=1.25$. The average trade deficit ratio worked out to 0.8. The price elasticity of import supply was assumed to be infinite. The price elasticities of import and export demand were derived from the European and U.S. price elasticities for four major commodity groups of India's imports and exports. A value of -2.0 both for import and export price elasticity was obtained in this way. Price elasticity of export supply ($b=2.3$) was the weighted average of nine export groups, weights being the composition of exports. With these values of the parameter, the equilibrium exchange rate r^* , in other words the shadow exchange rate, worked out to Rs.9.0 to a dollar. When the average tariff rate was increased from 0.25 to 1.0, that is to one hundred percent, an unreasonable assumption to make, the r^* increased to Rs.13.0 to a dollar. Calculation with alternative values of t in the range of 1.25 to 2.0 and also of price elasticities (assuming d to remain infinite in all the alternative) yielded the value of r^* in the range of Rs.8.6 to Rs.12.2 to a dollar. The mean value of Rs.10 which accorded with other estimates of the shadow exchange rate arrived at through alternative methods was then adopted for purposes of evaluating public projects. It also accorded with overall Effective Rate of Protection (33 percent) for industries and Domestic Resource Cost (Rs.10 per dollar earned or saved) obtained from very detailed exercise by Panchmukhi [16] for 1968. For further details, the reader may refer to John Beyer [3].

the international money market, the Indian rupee is not a commodity that plays any role in it. It is not a freely convertible currency. Secondly, if the reference is to the private black market in capital towns of India, then it must be noted that this market accounts for an insignificant fraction of the total foreign exchange transactions of the country. For this reason, the exchange rate signalled therein does not reflect the true scarcity value of foreign exchange for the country as a whole. Being illegal and connected with smuggling, it places a very large premium on the value of foreign exchange for fear of penal measures, if discovered. In view of this, and in spite of its serious limitations just noted, if such a market rate of exchange is used to correct for overvaluation of official rate, its effect is simply one of overestimation of "underpricing," in other words of "taxation/exploitation," as we shall see in Section III.

The foregoing discussion is meant to highlight the problem setting in which a study of agricultural protection/taxation based on the NRP estimate has to be carried out. Although, as we noted at the outset, India has frequently been chosen in the West to illustrate the case of "underpricing of agriculture" by the developing countries, no protection/exploitation study of Indian agriculture based on proper estimate of the NRP has as yet been carried out in India. The present paper is a modest beginning in this direction. It is confined to two major cereals, wheat and rice, one of which India has been a major importer until lately. Following Honma and Hayami [7], the period covered is 1955 to 1980 and the nominal protection indices (NRP and NPC) have been estimated for six-time points at each quinquennium, starting in 1955. Besides showing change over time in the levels of protection/exploitation, the aim is to see whether some comparative statements vis-à-vis industrialized and industrializing countries could also be made. The data used and their nature are discussed in the following section. The results have been presented and discussed in Sections III and IV. Finally, we give our concluding observations and make suggestions for the future direction of research on the subject.

II. THE DATA

The data on the wholesale market prices of wheat and rice for successive years are from *Bulletin on Food Statistics* (Ministry of Agriculture, Government of India). The reported annual figures are averages of the twelve months in the year for selected major wholesale markets in different states and union territories of India. For the year 1980, the terminal year of our exercise, the *Bulletin* reported such price data for thirteen wholesale market centers in wheat and thirty-five centers in rice. These market prices relate to different varieties—local and hybrids in wheat, fine and coarse varieties in rice including the hybrid IR8. The variety coverage is fairly wide. The reported annual price figures for each market center take care of the price difference arising from seasonal variations in market arrivals from the hinterland villages, though it would be still better if, instead of being simple averages, these were weighted by the monthly volume of market arrivals.

For the sake of comparability, it is these markets and their prices that we

followed through the period down to 1955. For any year, at first the simple average of the wholesale market centers falling within a state gives us the price figure for that state. At the second stage, a weighted average of state figures gives us the all-India wholesale market price of the commodity in question, weights being the relative shares of the covered states in the total production of the country. The production figures are also from the *Bulletin* mentioned above. Though the shares have varied over time,⁴ the states covered for reporting the prices together account for 88 to 94 per cent of wheat and 86 to 88 per cent of the total rice production through the period under study. Since production figures relate to crop-year, which does not synchronize with the calendar year to which the wholesale prices relate, shares for weighting are on the basis of three-year production, centering around the year in question. For instance, for the year 1980, the production figures of 1978–79, 1979–80, and 1980–81 have been added and then the shares in the total worked out to provide weights for 1980. Since some states were formed later during the period, this has necessitated treating Haryana and Punjab together, while Gujarat is included in Maharashtra for the 1950s.

The statistics on quantities and values of India's imports of wheat and rice are from *FAO Trade Year Book*, except for the year 1955. For this year, while the *Year Book* gives the quantity figures, it does not give the values. The *UN Year Book of International Trade Statistics, Vol. I*, on the other hand, gives value figures but not the quantities. When, however, matched with FAO quantity figures, it yields unreasonably low unit values. For this reason, we have adopted the 1956 UN figures on quantities and values for the year 1955.

Official exchange rate figures are again from the *FAO Trade Year Book*. Since values reported in these sources are inclusive of c.i.f., the import prices given in the subsequent tables, obtained by dividing values by quantities, are thus unit c.i.f. values. For purposes of adjustment for overvaluation of the exchange rate, we have placed a 33 per cent premium on foreign exchange. In other words, the dollar per rupee official rate has been reduced by this percentage for the 1960s and 1970. The rationale for this has already been discussed in Section I. For the late 1970s, that is 1975 and 1980, we have adopted the World Bank conversion factor given in Binswanger and Scandizzo [4]. For the initial year 1955, we have assumed that India's official exchange rate was not significantly different from the shadow exchange rate. At this time, India's balance of trade was still positive and the country had considerable reserves of foreign exchange in British pound sterling to which the Indian rupee had remained tied even after independence in 1947. Indeed this fact, inter alia, lay behind the adoption of a capital-intensive growth strategy during the Second Five-Year Plan.

III. THE RESULTS

Based on the above data, the estimated values of protection/taxation indicators are presented in Table I. It will be observed that at the official exchange rate

⁴ India, Ministry of Food and Agriculture, *Bulletin on Food Statistics*, various issues; idem, *Estimates of Area and Production of Principal Crops in India*, various issues.

TABLE I
ESTIMATION OF NOMINAL RATE OF PROTECTION (NRP), PRICE SUPPORT RATIO (PSR),
AND NOMINAL PROTECTION COEFFICIENT (NPC), 1955-80

Year	Domestic Prices		Border Prices ^a (U.S. \$/MT)	Nominal Rate of Protection		Price Support Ratio		Nominal Protection Coefficient	
	At Official Exchange Rate (U.S. \$/MT)	At Shadow Exchange Rate (U.S. \$/MT)		At Official Exchange Rate (%)	At Shadow Exchange Rate (%)	At Official Exchange Rate (%)	At Shadow Exchange Rate (%)	At Official Exchange Rate	At Shadow Exchange Rate
Wheat									
1955	70.413	70.413	64.615	8.97	8.97	8.23	8.23	1.09	1.09
1960	89.313	59.840	76.894	16.15	-22.18	13.91	-28.50	1.16	0.78
1965	146.475	98.138	73.210	100.00	34.05	50.02	25.40	2.00	1.34
1970	118.104	79.130	74.405	58.73	6.35	37.00	5.97	1.59	1.06
1975	169.980	135.984	195.551	-13.08	-30.46	-15.04	-43.80	0.87	0.70
1980	177.076	141.661	308.503	-42.64	-54.09	-74.26	-117.83	0.57	0.46
Rice									
1955	80.115	80.115	125.294	-36.06	-36.06	-56.39	-56.39	0.64	0.64
1960	113.988	76.372	94.146	21.07	-18.88	17.41	-23.27	1.21	0.81
1965	148.575	99.545	120.113	23.70	-17.12	19.16	-20.66	1.24	0.83
1970	150.716	100.980	138.165	9.08	-26.91	8.33	-36.82	1.09	0.73
1975	249.144	199.315	276.173	-9.79	-27.83	-10.85	-38.56	0.90	0.72
1980	286.461	229.169	400.212	-28.42	-42.74	-39.71	-74.64	0.71	0.57

Notes: 1. NRP = (Domestic price - Border price) / Border price × 100;

PSR = (Domestic price - Border price) / Domestic price × 100; and

NPC = Domestic price / Border price.

2. The respective values of official and shadow exchange rates for 1955-80 are: 1955 = 0.210, 0.210; 1960 = 0.210, 0.1407; 1965 = 0.210, 0.1407; 1970 = 0.133, 0.0891; 1975 = 0.120, 0.0960; and 1980 = 0.127, 0.1016.

^a c.i.f. values.

the values of the nominal rate of protection for the most part of the time during the period 1955–80 are positive, indicating in general protection rather than taxation. For rice, the NRP estimates, except for the year 1955, are positive though decreasing until these turn to negative values during the second half of the 1970s, indicating taxation. However, the turning is not due to any deliberate change in the government's agricultural policy during this period, but due to an unprecedented spurt in world market prices following the "world food crisis." It is notable (Appendix Table I) that while the wholesale market price of wheat in India increased by about 60 per cent in 1975 over 1970, the corresponding increase in the border price of wheat was of the order of 163 per cent. During the next five years while the Indian price stagnated, the border price went up by another 58 per cent in 1980. The story of relative price increases in respect of rice is similar, except that the difference was not so sharp. Between 1970–75, the wholesale market price of rice in India increased by 83 per cent as against 100 per cent increase in the border price. In the next quinquennium, whereas the Indian price rose modestly by about 9 per cent, the border price went up by as much as 46 per cent. The negative NRP value for rice and low positive value for wheat in 1955 are again largely attributable to the spurt in world market prices in the wake of the Korean War rather than state intervention in the market through public procurement or other measures. In fact readily available figures for 1956 to which our border prices relate, show (Appendix Table II) that procurement as a proportion of net domestic production in this year was the lowest (0.08 per cent) during the whole period under consideration and the bulk of public distribution of food depended upon imported supplies under PL 480 aid.

A comparison of NRP values at the official exchange rate for wheat and rice prior to 1975—the values for wheat being generally higher than for rice—lends support to the view that there was relative discrimination against rice producers [16], whatever the reasons, be they relatively lower procurement prices, zonal restrictions, or market imperfections due to non-interventionist causes. From 1975 the picture changed, however, in favor of rice. Although the NRP values for this period turn out to be negative for both commodities due to runaway world prices and indicate superficially a situation of taxation/exploitation, the magnitudes for rice are lower than those for wheat. The rice price increases were comparatively higher, accounting for lower NRP values.

Adjustment of the domestic wholesale market prices for overvaluation of the exchange rate changes the situation altogether for rice and considerably for wheat. The NRP values for rice get reduced to negative levels for every point of time during the period under study. For wheat, however, the rates, though reduced, still remain positive through the period prior to 1975. Since adjustment in both the commodity prices is by the same conversion factors, apparently the relative order of the NRP values over the period remains unchanged.

Can one then conclude that exchange rate and agricultural policies in India have had the effect of taxing or exploiting agriculture in favor of industries? A clear and unqualified answer to this question has still to wait for two reasons.

Firstly, it needs to be noted that our NRP estimates are not based upon unit f.o.b. values as they ought to be. For this, the wholesale market prices need to be adjusted for transport cost to port. By this adjustment we expect our NRP estimates even at shadow exchange rates to be pushed substantially upward towards positive or lower negative values.

Secondly, we expect our Effective Rates of Protection to be not only substantially higher but positive compared to our NRP estimates including at shadow exchange rates. This is because, as pointed out earlier, public subsidies, direct and indirect, for agriculture in India, particularly through subsidized modern inputs (fertilizers, pesticides, certified hybrid seeds, irrigation water, electricity, diesel oil, and others) and agricultural machinery, are enormous and have been increasing [19] over time. Even as early as 1970–71, these modern inputs at 1960–61 constant prices inclusive of subsidies accounted for 21 per cent of all purchased inputs for agriculture [5]. By 1980, the terminal year of our exercise, their level could be anywhere above 25 per cent, particularly in relatively advanced states.⁵ While some of the inputs, like fertilizer, pesticides, seeds, etc., are supplied by governmental agencies at subsidized prices others, like irrigation water and electricity, are supplied by infrastructural public services at tariff rates far below the shadow prices of these inputs, in other words, their social opportunity costs. In brief, thus, both these points when taken into account will strengthen the position in favor of protection rather than exploitation.

The “underpricing” argument in general is valid only when it is advanced vis-à-vis world market prices. However, in point of fact it has been stretched much further to suggest that governments in the developing countries use it as a means to cheaper industrialization cost. This contention at least is not true for India. The real test whether such a phenomenon exists is provided not by reference to world market prices but to the relative prices of agriculture vis-à-vis industry or nonagriculture, in other words, whether the terms of trade are in favor of or adverse to agriculture within the domestic economy. On this score, Indian agriculture presents a different story. Throughout the period, barring a few years prior to 1965, the terms of trade (agriculture to nonagriculture) have been favorable to agriculture as a whole and also to foodgrains specifically [21] [22]. In fact, the index of the barter terms of trade shows an accelerated growth since 1965–66, synchronizing with the introduction of “new agricultural technology.” Similar is the story of agriculture’s income terms of trade, including the phenomenon of acceleration since 1965–66 in conformity with the acceleration observed in the rate of growth of agriculture’s marketed surpluses (Appendix Table III). If we narrow down the focus to terms of trade agriculture in India has with manufactures alone, the readily available data on price indices simply repeat the story. At the base of 1961–62, the index of prices of manufacture stayed at 69 to 83 per cent of the index for agricultural commodities during 1965–66 to 1974–75 [5]. The conclusion is unmistakable: there has been no exploitation or taxation of agriculture in India in favor of cheap industrialization.

⁵ India, Ministry of Agriculture, Directory of Economics and Statistics, *Comprehensive Scheme for Studying the Cost of Cultivation of Principal Crops*, 1980.

TABLE II
COMPARISON OF THE NOMINAL RATES OF PROTECTION BETWEEN INDIA,
INDUSTRIALIZED AND INDUSTRIALIZING COUNTRIES

Year	EEC	Japan	Korea	Taiwan	India (%)	
					At Official Exchange Rate	At Shadow Exchange Rate
Wheat						
1955	45.9	30.5	-38.4	62.5	9.0	9.0
1960	36.4	50.8	-13.4	31.4	16.15	-22.2
1965	40.9	82.1	7.9	43.2	100.00	34.1
1970	54.1	133.6	14.9	55.4	58.73	6.4
1975	3.2	82.1	-2.3	6.5	-13.08	-30.5
1980	17.8	261.0	33.2	81.3	-42.64	-54.1
Rice						
1955	17.1	23.9	-43.6	-20.0	-36.1	-36.1
1960	39.4	47.5	-15.8	-4.1	21.07	-18.9
1965	35.7	98.8	-4.5	-14.2	23.70	-17.1
1970	39.8	134.7	30.3	-3.6	9.08	-26.9
1975	8.5	123.7	44.6	18.2	-9.79	-27.8
1980	43.5	192.4	155.8	135.6	-28.42	-42.7

Note: Figures for the EEC and Japan are from Honma and Hayami [8]; those for Korea and Taiwan obtained from Hayami through personal communication.

On the contrary, the industrial sector has been securing agricultural surpluses at increasing costs [10] through the period under study.

IV. COMPARISON WITH OTHER COUNTRIES

It may be worthwhile now to have a comparative look at the NRP estimates for India and some other countries. The figures are presented in Table II for wheat and rice. Those for the EEC, the Republic of Korea, Taiwan, and Japan are from Honma and Hayami [8]. These figures are admittedly underestimates of nominal protection levels based as they are on producer rather than on wholesale market prices. Provided we bear this in mind, these figures can be compared with those for India at official exchange rates. It would not be valid to compare them with NRP figures for India at shadow exchange rates because that would imply that the official exchange rates of the countries in point are identical with their equilibrium exchange rates, a supposition that is unreal. Furthermore, it is the official exchange rates at which the NRP estimates for these countries have been made.

It will be useful to compare the figures over the two time phases of the period, prior to 1970 and thereafter, for which the spurt in world market prices following the "world food crisis" rather than any deliberate reduction in domestic prices accounts for the drastic fall in the nominal protection rates. During the first phase,

right from 1955 nominal protection levels were far higher in the industrial advanced countries than in India for both wheat and rice. Discounting the Indian figures for wheat in 1965 as unduly abnormal due to severe drought particularly in the wheat zone of the North-West, it is remarkable to note that the nominal protection level for wheat in India rose faster than in the EEC and even Japan. For rice, the picture is a mixed one: it rose from a negative level in 1955 to a reasonably high positive level in 1965, but registered a fall in 1970. This happened in spite of the fact that domestic rice prices increased very much faster compared to wheat prices during 1965-70 and even thereafter (Appendix Table I). The reason for the fall, therefore, lies in the international price rise for rice.

During the second phase, the precipitous fall in the NRP for the developed countries in 1975 over the precrisis base of 1970 was reversed during the late seventies. Except in the case of wheat in the EEC, the rates not only regained but surpassed the precrisis levels, particularly in Japan, whereas in India the NRP further declined towards the negative range. The developed countries' response to inflationary world market prices, thus, was one of further protective measures. India had to remain satisfied with a measure of comparative domestic price stability (Appendix Table I). Korea and Taiwan, the newly industrialized countries, had a response similar to those of the EEC and Japan to the inflationary world market prices during the late 1970s. However, the NRP for rice were negative both in Korea and Taiwan, though Taiwan had a positive level of protection for wheat comparable to EEC levels. In comparison to Korea, the Indian NRP figures for both rice and wheat were higher prior to 1970. Thereafter, whereas Korea quickly moved to high levels of positive protection comparable to industrialized countries, India dropped into the negative range. Perhaps the explanation for this lies in the pattern of decline in the share of agriculture in the domestic income of the two countries.

A number of factors have been identified to explain the growing phenomenon of agricultural protection in the developed countries, chief among them being declining share of agriculture in domestic income, adverse international terms of trade for agriculture vis-à-vis manufacture, agriculture's comparative disadvantage in the domestic economy (falling ratio of labor productivity in agriculture to labor productivity in the domestic economy), concern for food self-sufficiency as part of national security [8] and finally lower resource endowment such as per capita land availability. India today is at a stage of development when all these factors are strongly impinging on her economy. We have just seen how the nominal protection rate for wheat in India, though staying lower, rose at a faster rate than in the industrialized countries. Learning from the growth success of these countries and the pressure of the above causative factors, India in the 1980s seems to be well set towards moving from a weak to strong external protection for her agriculture. In 1985, the government of India made efforts to sell a part of its procured stocks of 30 million tons of wheat and rice in the international market. The effort failed because Indian prices were higher than world market prices.

V. SUMMARY OF CONCLUSIONS

In summary, the results from the present study should dispel the widely held impression in the West that India has kept her agriculture "underpriced" or has been exploiting it for the sake of cheaper industrialization. The estimates of nominal protection rates for two major foodgrains, wheat and rice, worked out to be positive since 1955 except for 1975 and 1980, a period when runaway world market prices sharply impinged upon the pattern everywhere. However, for this phase, it is noteworthy that the nominal protection rate for wheat in India grew at a much faster pace than in the industrially advanced countries including Japan. This happened in spite of the fact that India until lately has been chronically short of food and in a situation where she was able to maintain a greater measure of stability in domestic prices compared to world market prices, specially those of wheat. In comparison to a newly industrialized country like Korea, nominal protection rates for India were higher up to the early 1970s. Since then, taking advantage of the faster rate of industrialization and considerably reduced share of agriculture in the domestic income, Korea has reversed the situation and moved to very high levels of agricultural protection comparable to Japan and the EEC countries.

Internally, terms of trade in India have consistently and increasingly been favorable to agriculture as a whole and also to foodgrains. In this, the open market forces have played an overriding role. It is perhaps not known to the aforementioned critics that public procurement in India never exceeded more than 12 per cent of cereal production since independence and never exceeded a mere 2 per cent level up to 1964. No other foodgrains, raw material, plantation crops or such others have ever come under the public procurement system. When the market mechanism had such a predominant role, why it is that growth of Indian agriculture has been comparatively low? One of the most careful and objective economists of Indian agriculture, Dharam Narain [15], has concluded that technological breakthroughs are far more important than product prices for growth. Half of the potentially irrigable land is still unirrigated in India. For the remaining half, namely, the dry and rainfed lands, no viable technological breakthrough has as yet been achieved, including for rice. Not because money allocation for research has been poor, but because scientific results do not come merely for the asking. Many that come do not easily suit the farmer's field conditions. Furthermore, it is not just the 25 per cent of the producers with relatively large holdings accounting for 75 per cent of the marketed surplus (35 per cent of the total produce) who contribute to growth. Agricultural growth equally importantly depends upon the vast majority of middle class, small, and marginal cultivators of India who together operate half if not more of the cultivated area, primarily for meeting self-consumption needs.⁶

⁶ A detailed review of the structure and development of agriculture in India since the inception of planning along with relevant statistics bearing on these factors is to be found in the report of the working group set up by the Indian Council of Social Science Research [10]. Our discussion in the concluding section draws heavily upon this report.

Many of the other points of criticism of Indian agricultural policy, such as urban bias, failure to achieve equity etc., have already been dealt with comprehensively [5] and there is no point in our dwelling upon them further. This is not to claim that the policy has been flawless, but the criticisms have been largely uninformed or rather illinformed.

VI. DIRECTION OF FUTURE RESEARCH

In Section I we pointed out two biases that may creep in NRP estimates due to inappropriate choice of prices and exchange rates. Our own NRP figures based on wholesale market prices, though better than any others based on produce prices, are nevertheless underestimates. Accordingly, in a future study the wholesale market prices will have to be adjusted for marketing, storage, and cost of transport to port so as to approximate as closely as possible to unit f.o.b. values. The unit c.i.f. values which are supposed to reflect competitive world market prices are, in fact, conditioned by the protectionist agricultural policies of the developed countries. To what extent these could be corrected for such policy distortions needs to be examined in order to see how NRP estimates for developing countries like India will be affected. As for exchange rates, while we have estimated NRP for India at shadow exchange rates in order to take into account overvaluation of the domestic currency, any future study must as well account for overvaluation of the U.S. dollar—a phenomenon now universally recognized—if its continued use for international comparison is to be retained. Besides these lines of further study which are directed towards obtaining better NRP estimates, the present study for India ought to be extended to achieve wider commodity coverage, bringing into the picture some of the major nonfood items like tea, coffee, cotton, and sugar. And for purposes of explaining the behavior of NRP in terms of its possible causative factors through a regression analysis, it would be desirable to prepare NRP estimates for shorter intervals, while bringing the period of the 1980s under coverage at the same time.

All said and done about the NRP does not, however, obviate or preclude the necessity of estimating the Effective Rate of Protection (ERP) as the eventual means for appraising levels of agricultural protection/taxation, whether one's focus is on any one country or on inter-country comparison. Besides factors like public subsidies alluded to earlier, which necessitate investigation into the ERP as a better indicator of real situation, there are two additional methodological reasons justifying such an exercise. Firstly, under certain conditions NRP may turn out to have a sign opposite to that of ERP and may thus point to a reverse situation in respect of protection/taxation. This is borne out by the estimates of ERP and NPC (refer to Section I for definition) for Kenya, Mexico, the Philippines, and Yugoslavia among the developing countries for which such estimates have been compiled by the World Bank sources [1, Table III]. In the first two cases, whereas NPC values for all or most reported crops are greater than one, indicating protection, corresponding ERP values are negative and thereby indicate taxation. Just the reverse of this situation holds in the case of the Philippines and Yugoslavia. In brief, exclusive reliance on NRP or NPC

may thus, turn out to be misleading. Secondly, in the absence of unit f.o.b. values or due to difficulties of estimating them, domestic producer or wholesale prices of sorts have customarily been used in the literature as proxies for purposes of NRP estimation. It can be easily shown, however, that such proxies lead to an *underestimation* of NRP in the event of positive protection on the one hand and *overestimation* in the event of negative protection on the other.⁷ Now if we were to suppose that taxation/exploitation is the general rule among the developing countries then NRP, because of this property, simply exaggerates this case and puts at the same time a damper on the protection levels of the developed countries. For this reason, comparison between these two sets of countries purely on the basis of NRP estimates, if not altogether illegitimate, surely carries a measure of distortion. It is for these methodological and substantive reasons that our future research on this theme of agricultural protection should cover ERP estimation in addition to strengthening and extending estimates of the NRP itself along the lines suggested earlier.

⁷ The following numerical example illustrates the point. The unit f.o.b. values are randomly chosen. Unit producer prices are uniformly 20 per cent lower than corresponding f.o.b. values. Estimated NRP values speak for themselves.

	Unit C.i.f. Values (1)	Unit F.o.b. Values (2)	Unit Producer Prices (3)	NRP (%)	
				True Rate (4)	Biased Rate (5)
Positive protection situation					
	100	130	104	30	4 Under- estimation
Negative protection situation					
	100	75	60	-25	-40 Over- estimation

Note: NRP, Col.(4)=[Col.(2)-Col.(1)]/Col.(1)
 NRP, Col.(5)=[Col.(3)-Col.(1)]/Col.(1).

Since producer prices are invariably lower than wholesale prices, the former, therefore, *ceteris paribus*, introduce comparatively more overestimation of the level of taxation/exploitation. One study by Binswanger and Scandizzo [4] uses producer prices without making it clear which set of producer prices have been used, how these have been aggregated to arrive at figures for India as a whole, and how these have been in turn adjusted for transport cost to port. Notwithstanding these issues, their estimated values of NPC for wheat and rice without adjustment for overvaluation of exchange rate are respectively 1.0 and 0.81 for India in 1980. These are substantially higher (see Table I in the text) than our own estimates on the basis of wholesale prices without correction for cost of transport to port. If their import prices (unit c.i.f. values) are the same as ours, then the transport cost seems to make a very substantial difference between the two sets of estimates. Given this and given the fact of wholesale prices being higher than producer prices, if we were to adjust the wholesale prices for cost of transport to port in a future study, it is very likely that our own NRP estimates will get pushed up into the protection range for the 1970s as well.

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APPENDIX TABLE I
 CHANGE IN DOMESTIC WHOLESALE MARKET AND BORDER PRICES, 1955-80
 (Per metric ton)

Year	Domestic Prices ^a (Rs.)	Increase	Percent Increase	Border Prices ^b (U.S. \$)	Increase	Percent Increase
Wheat						
1955	335.3	—	—	64.615	—	—
1960	425.3	90.0	26.84	76.894	12.28	19.00
1965	697.5	272.2	64.00	73.210	-3.68	-4.79
1970	888.0	190.5	27.31	74.405	1.195	1.63
1975	1,416.5	528.5	59.52	195.551	121.15	162.82
1980	1,394.3	-22.2	-1.57	308.579	113.03	57.80
Coefficient of variation ^c 0.50				0.70		
Rice						
1955	385.1	—	—	125.294	—	—
1960	542.8	197.7	51.34	94.146	-31.15	-24.86
1965	707.5	164.7	30.34	120.113	25.97	27.59
1970	1,133.2	425.7	60.17	138.165	18.05	15.03
1975	2,076.2	943.0	83.22	276.173	138.00	99.89
1980	2,255.6	179.4	8.64	400.212	124.04	44.91
Coefficient of variation ^c 0.61				0.57		

^a Weighted average of wholesale annual (average of months) market prices, weights being the shares of the states in total production.

^b c.i.f. values.

^c $v = \sigma/\mu$, where μ is arithmetic mean and σ is standard deviation and $= \sqrt{[X - \mu]^2/N}$, where X is the observed value and N is number of observations.

APPENDIX TABLE II
 NET DOMESTIC FOODGRAIN PRODUCTION, IMPORTS, INTERNAL
 PROCUREMENT, AND ISSUES FOR SELECTED YEARS

(Million tons)

Year	Net domestic Production	Imports	Procurement	Issues	Col. (3) as % of Col. (5)	Col. (4) as % of Col. (2)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1951	40.18	4.18	3.82	7.99	60.0	9.51
1956	50.43	1.39	0.04	2.08	66.7	0.08
1961	60.89	3.50	0.54	3.98	87.9	0.89
1962	61.85	3.64	0.48	4.37	83.2	0.78
1963	60.19	4.56	0.75	5.18	88.0	1.25
1964	61.79	6.27	1.43	8.67	72.3	2.31
1965	67.33	7.46	4.03	10.08	74.0	5.99
1966	54.60	10.36	4.01	14.09	73.5	7.34
1967	57.65	8.67	4.46	13.17	65.8	7.74
1968	72.58	5.69	6.81	10.22	55.6	9.38
1969	73.14	3.87	6.38	9.39	41.2	8.72
1970	76.83	3.63	6.71	8.84	41.0	8.73
1971	84.53	2.05	8.86	7.82	26.2	10.48
1972	82.31	0.45	7.67	10.48	4.2	9.32
1973	76.23	3.61	8.42	11.40	31.6	11.05
1974	82.13	4.78	5.68	10.61	45.0	6.92

Source: I. S. Gulati and T. N. Krishnan, "Public Distribution and Procurement of Foodgrains: A Proposal," *Economic and Political Weekly*, May 24, 1975.

APPENDIX TABLE III
 INDICES OF TERMS OF TRADE, OUTPUT, AND MARKETED
 SURPLUS OF INDIAN AGRICULTURE

(1960-61=100)

Year	Net Barter Terms of Trade	Foodgrains Terms of Trade	Terms of Trade of All Agricultural Products	Income Terms of Trade	Agricultural Output	Marketed Surplus of Agriculture
1951-52	100.72	104.47	116.89	67.07	68.45	66.59
1952-53	99.13	116.84	96.28	72.41	72.15	78.05
1953-54	103.74	112.54	102.83	88.40	81.89	85.21
1954-55	97.02	91.84	95.47	85.99	82.57	88.63
1955-56	94.78	92.02	89.10	88.20	82.38	98.06
1956-57	102.46	109.20	98.16	100.67	87.15	98.25
1957-58	98.46	107.11	96.07	92.15	81.50	93.59
1958-59	101.66	113.43	98.37	97.95	94.06	96.35
1959-60	101.68	105.88	98.85	94.43	91.82	92.87
1960-61	100.00	100.00	100.00	100.00	100.00	100.00
1961-62	100.89	98.38	97.64	106.20	100.29	105.47
1962-63	99.09	99.69	95.16	106.17	98.73	107.15
1963-64	97.39	101.59	96.77	108.90	101.17	111.82
1964-65	108.66	118.80	107.88	124.67	111.98	114.73
1965-66	114.47	120.60	110.17	123.95	93.28	108.28
1966-67	123.07	131.81	117.56	129.04	93.38	104.85
1967-68	125.02	148.10	123.74	149.99	113.53	119.97
1968-69	116.27	126.91	122.21	143.62	111.78	123.52
1969-70	125.72	131.05	126.72	167.08	119.28	132.90
1970-71	127.32	125.82	124.20	178.88	127.95	140.50
1971-72	120.08	122.65	119.29	181.31	127.46	150.99
1972-73	118.90	128.20	119.23	173.81	117.43	146.18
1973-74		134.40	134.14	206.11	128.14	150.47
1974-75	133.92	146.78	128.16			
Compound rate of growth (%)	1.43	1.43	1.34	4.53	2.53	3.11 ^a

Source: [21].

^a 3.10 for 1951-52 to 1965-66 and 5.00 for 1965-66 to 1973-74.