Common to all of the individual sector studies is an attempt to assess the comparative advantage of the sector and, further, to measure the effect of price intervention policies on the returns to the producers in the sector. For the former, the measure used in all studies was the domestic resource cost (DRC) of earning and saving foreign exchange. For the latter, nominal protection rates (NPR), implicit tariffs (IT), effective protection rates (EPR), and net effective protection rates (NEPR) were calculated.

In this appendix, we set out the various definitions, assumptions, and procedures that were used to estimate these measures. In addition, we attempt to clarify the meaning and implications of these measures, as well as to note some of their shortcomings.

Comparative Advantage

Comparative advantage refers to the relative efficiency of an activity in saving foreign exchange through import substitution or earning it through exports. In the long run, the nation must balance its foreign exchange budget; but to accomplish this with maximum efficiency means to do so at least cost in social value of resources used. Accordingly, if one activity requires less at the margin in domestic resource costs to save or earn a unit of foreign exchange than another activity, the former is comparatively advantageous in relation to the latter. Thus activities can be ranked at

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the margin according to comparative advantage by comparing their DRCs. Choosing an activity with a lower DRC in preference to one with a higher DRC means reducing the social cost of balancing the foreign exchange budget.

Formally,

\[
\text{DRC} = \frac{\text{domestic costs in shadow prices per unit of output}}{\text{border price of output minus foreign cost per unit in border prices}}
\]

The numerator is in local currency, while the denominator is in foreign currency, so that the result is, in effect, the "own exchange rate" for the activity. DRCs can be compared not only with each other, but also with the shadow exchange rate (SER), which represents a kind of average of the costs of obtaining foreign exchange in all activities, and is taken to represent the social value of foreign exchange.

The comparison of the DRC with the SER is related to the concept of net social profitability. Consider a simplified situation where we have only internationally traded goods and primary factors (labor, capital and land). (Conceptually, non-traded goods can be decomposed into traded goods and primary factors.) Using the following notation:

- \(P_x\) is the shadow (border) price of the output,
- \(X\) is the quantity of output,
- \(P_y\) is the shadow (border) price of the material inputs,
- \(Y\) is the amount of material inputs used,
- \(P_d\) is the shadow price of domestic primary factors,
- \(D\) is the amount of domestic primary factors used,
- \(\sigma\) is the shadow exchange rate, and
- \(n\) is net social profitability,
Then

\[ n = (P_x - P_y)s - P_d D \] (1)

This general formula for net social profitability is not useful, however, for comparing activities (or projects). One activity might have a higher total \( n \) simply because it was using more resources and producing more output. Greater efficiency implies, however, that resources are used more productively in attaining some goal. This means that we are interested not in total \( n \), but in \( n \) per unit of output, or \( n \) per unit of primary factors, or \( n \) per unit of foreign exchange earned or saved.

Dividing both sides of equation (1) by \( x \) gives \( n \) per unit of output. If instead we divide both sides by \((P_x - P_y)\), we have \( n \) per unit of foreign exchange earned or saved. But

\[ \frac{n}{P_x - P_y} = \frac{P_d D}{P_x - P_y} = s - DRC \] (2)

Dividing both sides of equation (1) by the value of primary factors used (value added) gives

\[ \frac{n}{P_d D} = \frac{(P_x - P_y)s}{P_d D} - 1 = \frac{s}{DRC} - 1 \] (3)

Note that both equations (2) and (3) give DRC as the appropriate measure of comparative advantage.

Finally, we could separate the primary factors and calculate \( n \) per unit of each. If, as in the Philippines, ordinary labor is considered to be in surplus supply, it would not make sense to do this with labor. We are not as concerned to economize the use of labor as the use of capital and land. Dividing both sides of equation (1) by the value of
capital used gives n per unit of capital; and that rate of interest which would make n=0, is the so-called "internal rate of return" of the activity. Alternatively, dividing both sides by the amount of land used gives n per unit of land; and that rental price of land that would make n=0 might be called the "own land rent" of the activity.

All of these measures of social profitability are consistent in identifying activities that are socially profitable or unprofitable. They are not equivalent, however, in ranking projects. If there is some constraint (capital, land, foreign exchange, demand) that precludes inclusion in the investment budget of all socially profitable activities, a choice must be made. The general rule is to select the most strongly constraining element as the divisor, whether it be demand, capital, land or foreign exchange.

Despite this, it is often assumed that n per unit of output is the general criterion and the use of DFC has been criticized because it is not consistent in ranking with the former. Yet for internationally tradable goods output should never be the limitation factor. We want all the output we can get subject to some resource constraints. For non-tradable goods and services, of course, domestic demand would represent a constraint and this measure might well be the appropriate one. The popularity of n per unit of output might stem from its legitimate use in evaluation of public projects relating to transport, water supply, etc. a road of a definite length, a fixed quantity of water for a village, for example. But in evaluating activities producing internationally traded goods, it is clearly inappropriate. Rather, the DFC measure of social profitability is the appropriate one for identifying comparative advantage.
Capital and land are both relatively scarce in the Philippines; but for agricultural activities land would be the more important constraint. (Note, however, that irrigation capital can substitute for land.) It might seem that for this reason the own rent of agricultural activities would be the preferred indicator of comparative advantage.

Instead we have opted for domestic resource cost. There are perhaps three principal reasons for this choice. First, it is the most widely used measure of comparative advantage, especially in less-developed countries. Thus it is useful for purposes of comparison. Second, its wide use may reflect the fact that, owing to circumstances or policies, foreign exchange limitations do indeed represent a severe constraint on development in countries like the Philippines. Finally, as we have seen in equation (3) above, DRC is the relevant measure also if we make domestic resources in the aggregate the principal constraint. For this reason it might be said to represent a more nearly general criterion than any of the others.

Nevertheless, when we are comparing agricultural activities the relation between the DRC of an activity and the shadow exchange rate may not be the most important question in assessing comparative advantage. The reason is that the SER reflects the value of primary resources employed across the whole economy, including many activities which are more complementary in supply than competing with agriculture. On the other hand, the various agricultural activities are strongly competing, particularly in the use of land.
This is important for the following reasons. Most agricultural activities studied showed comparative advantage — i.e., a DRC less than the SER. The standard implication is that they all should expand at the expense of non-agricultural activities which have DRC's greater than the SER. Yet to expand all simultaneously would quickly run up against severe competition for scarce land. The contraction of non-agricultural activities, on the other hand, would free capital and labor — not land. To the extent that capital and labor can be substituted for land in agricultural production, the problem would be eased; but the possibilities for economical substitution of this sort are probably quite limited.

This means that we must recognize that the expansion of a particular agricultural activity may be more at the expense of other agricultural activities than at the expense of non-agriculture. The implication is that it may be more important to compare an agricultural DRC with other agricultural DRC's than with the SER. It also suggests that the own rent of an activity might be a useful measure of comparative advantage for agricultural sub-sectors. The advantage of the DRC is that it includes all primary factors. The advantage of the own rent is that it focuses on the one factor that is critically scarce for many agricultural activities.

Shadow Prices

In the estimation of DRC's, all values reflect shadow prices, or the social opportunity costs of goods and services, factors of production and foreign exchange. The reason is, of course, that market prices often are distorted by market imperfections and government policies. These distortions
are not easy to measure and we did not attempt to make new estimates of
the shadow prices of labor, capital and foreign exchange. Rather we
relied where necessary on the previous work of Medalla (1979) and the
National Economic and Development Authority (NEDA).

The shadow wage rate varied from study to study, depending on
particular labor market conditions. Where there was a relatively free
labor market, the market wage was assumed to equal the shadow wage. For
industrial activities -- e.g., wood processing -- the shadow wage for
unskilled labor was put at 80 per cent of the market wage, following
Medalla (1979).

The shadow rate of interest used to price capital was in all studies
taken to be 15 per cent. This is the shadow rate that NEDA has used in
project evaluation. It is also very close to the social rate of
discount estimated by Manalaysay (1979) in the Industrial Promotion
Policies Philippines (IPPP) project.

The shadow price of foreign exchange was taken to be in the range
of 20 to 30 per cent above the official rate for the late 1970's and
early 1980's, following the work of Medalla (1979) in the IPPP project.
Generally, the lower value of 20 per cent was used, though some studies
considered the range.

The SER estimation was based on the distortion of market prices
from border prices owing to the effects of tariffs, export taxes, and
discriminatory indirect taxes. It did not take into account any element
of disequilibrium in the foreign exchange market. In other words, the
assumption was that the official rate was an equilibrium rate; but that
it was a distorted equilibrium with supplies and demands for foreign exchange
affected by various price intervention policies. If we would judge that by the early 1980's an element of disequilibrium had emerged (as suggested by the subsequent depreciation of the peso), our estimate of the SZR would be too low for that period.

The shadow prices of internationally tradable goods were taken to be their border prices -- FOB export prices and CIF import prices. These represent the opportunity costs to the Philippine economy for the use of these goods. From a world viewpoint these border prices might themselves be distorted by monopoly elements in world markets and by the policies of other governments. From the viewpoint of the Philippines, however, they represent the trading opportunities that the nation must take as given at any time. Only through multinational negotiations within and without ASEAN and GATT can these opportunities be improved.

An exception to this would be those cases where the Philippines has some degree of monopoly power in world markets. In general it was judged that this was weak or non-existent from a long-run viewpoint. Where it was considered an issue, however -- e.g., coconut and wood products -- the implications were taken into account.

A particular difficulty with respect to border prices is the non-homogeneity of goods. If the good imported or exported is judged to be the same as that produced and sold in the domestic market, the CIF and FOB prices can be used without qualification. Where this kind of homogeneity does not exist some adjustment must be made. The nature of the adjustment differed from study to study, depending on particular circumstances. Some of the more important approaches are discussed below in the section on protection.
Nontradable goods are those for which either transport costs or government policies preclude import or export. Conceptually they could be decomposed into tradable goods and primary factors, so that their shadow prices would reflect those of the latter. The alternative, which was followed in all studies, is to assume that the opportunity cost of using nontradables in an activity is the value of their use elsewhere in the economy; and that this value is reflected in their market prices.

**Allocation to Domestic and Foreign Costs**

If nontradables were actually decomposed into tradables and primary factors, and if there were no controls on imports or exports, it might be appropriate to include only primary factors in domestic costs (as in the theoretical discussion above in the first section). In our studies this was not done and nontradables were included in domestic costs with their shadow prices taken to be represented by their market prices, as noted above.

For tradables, two alternative approaches were employed in allocating costs. In the historical method, costs were allocated on the basis of historical data. That is, it was assumed that with the expansion of an activity the historical proportions of domestic and foreign sources would prevail. This method was used in all studies.

In a few cases, alternative DRC estimates were made on the basis of the "fully-traded" method of cost allocation. In this case, all tradable inputs are allocated to foreign cost. The assumptions behind this method are that trade is not controlled and there is no slack in the economy, so that expansion of production anywhere would require more imports or less exports.
Finally, capital costs were allocated according to the estimated source, following the method of the IFPP project. Depreciation was allocated according to the source of the capital goods; while interest was allocated according to the source of the loan.

Protection

In the absence of government price intervention policies, the domestic prices of internationally tradable homogeneous goods would equal their border prices. We could turn this around and say that what we mean by "price intervention policies" are those policies that create a wedge between domestic and border prices. This difference may be positive or negative, implying either an implicit subsidy or tax.

For non-homogeneous goods the same policies may permit a quality differential rather than a price differential, or some combination of the two. In an equilibrium situation, marginal buyers or sellers would be indifferent between the domestic and world markets as their source or destination of supply, given the combined quality and price differential.

Most agricultural commodities are potentially tradable internationally and, therefore, may be subject to price intervention policies. Some would be considered nontradable if transport costs or government policies precluded export or import of significant quantities. We consider tradables first.

Price intervention policies in the Philippines include import duties or quotas, export taxes or quotas, sales taxes that discriminate between foreign and domestic products, and the pricing policies of government marketing agencies.
Custom duties permit a higher (quality adjusted) domestic price relative to border price. The reason is that when the duty is imposed buyers will divert demand to the domestic version until its price has risen comparably to the duty-inclusive price of the foreign product. A quota will have a similar effect by diverting demand to the domestic product. The principal difference is that with import duties the government receives revenue; while with quotas it is the import licensees who gain.

Export taxes and quotas have the opposite effect, depressing the (quality adjusted) domestic price below border price by diverting supply to the domestic market. Again, with the export tax it is the government who gains revenue; while with quotas the windfall goes to the export licensees.

Government marketing agencies that buy or sell (or both) in domestic and international markets can also create a wedge between domestic and border prices (after quality adjustment) by their pricing policies. Such agencies exist in the Philippines for rice, corn, wheat, sugar, cotton and tobacco, among others. In each of the relevant studies an attempt was made to measure the effects of their pricing policies on the relation between domestic price and border price.

Generally, two measures of the wedge between domestic and border price have been used — the nominal protection rate (NPR) and the implicit tariff (IT). Both are measured as a proportion of the border price. The former uses as domestic price the net price to the seller; while the latter uses the price to the buyer. The former is often lower than the latter because of a sales or excise tax. It may also differ when government
marketing agencies set (or induce) different prices to sellers and buyers. Thus,

\[
NFR = \frac{P_{ds}}{P_b} - 1, \quad \text{and} \\
IT = \frac{P_{db}}{P_b} - 1, \quad \text{where}
\]

\(P_{ds}\) and \(P_{db}\) are domestic prices to sellers and buyers, respectively; while \(P_b\) is border price.

Whereas the domestic prices of tradables are thus constrained by border prices and the protective effect of price intervention policies, there are no such constraints on the prices of nontradables. Therefore, we generally assume that taxes and subsidies are passed on by the sellers of nontradables. Moreover, since there are no border prices for nontradables, the question of nominal protection or implicit tariff does not generally arise. An exception, however, is the case of a nontradable commodity that is an input in the production of a traded good. Here the nontradable may share in the protection accorded the processed good; and a model that was developed to measure this was applied in several cases.

To measure \(NFR\) and \(IT\), two approaches were employed. The first was to compare prices directly — domestic and border. In the case of a number of importables, imports were not in sufficient quantity to justify the use of CIF import unit values, and import prices of other Asian countries — notably Hongkong and Singapore — were used.

A second, indirect, method was to assume that the known tariff and sales tax rates would measure the proportional difference between the two
prices. For perfectly homogeneous goods, when marketing costs are zero, the two methods should give the same result, assuming free competition. That is, at the margin, buyers should face the same price for identical goods from either source. For non-homogeneous goods we assume that the wedge represents a combined quality and price differential.

Since agricultural commodities tend generally to be more nearly homogeneous than industrial goods, the various studies did include direct price comparisons. In most cases the indirect method was also employed for comparison.

Since even agricultural commodities are rarely perfectly homogeneous, however, and marketing costs are always present, two kinds of adjustments may be necessary when making price comparisons. Considering marketing costs first, either the domestic or the border price must be adjusted to ensure that the two represent comparable points in the marketing chain. That is, the respective prices should represent practical alternatives to a buyer and should include marketing costs from both sources to that point.

Quality differences present a more serious problem. One means employed of attempting to measure a quality differential was to measure the price differential during a period when the price intervention policy was not in effect (if such a period exists), and assume that this differential represents the quality differential also during the period when the price intervention policy was in effect. The difference between the price differentials in the two periods, then, is taken to represent the effect of the policy. There is a tacit assumption, of course, that the quality differential remained constant.
It should be emphasized that NPR and IT can be negative, as well as positive. Indeed for agricultural products subject to export tax or government trading monopolies, estimates of protection tended to be negative.

Table 1 summarizes the procedures employed to measure NPR's and IT's for the various sectors considered in the study. Sectors 1 to 14 represent outputs; while 16 to 20 represent the major inputs.
Table 1. Definitions and procedures adapted in the estimation of protection rates in agriculture by commodities.

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Type a/</th>
<th>Nominal Protection b/</th>
<th>Implicit Tariff b/</th>
<th>Border Price d/</th>
<th>Domestic Price e/</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rice (milled)</td>
<td>M, PC</td>
<td>PC</td>
<td>PC</td>
<td>M</td>
<td>WP</td>
</tr>
<tr>
<td>2. Corn (shelled)</td>
<td>M</td>
<td>PC</td>
<td>PC</td>
<td>M</td>
<td>WP</td>
</tr>
<tr>
<td>3. Sugar (centrifugal)</td>
<td>X</td>
<td>PC</td>
<td>PC</td>
<td>X</td>
<td>WP</td>
</tr>
<tr>
<td>4. Copra</td>
<td>X</td>
<td>PC</td>
<td>PC</td>
<td>X</td>
<td>WP</td>
</tr>
<tr>
<td>5. Coconut oil</td>
<td>X</td>
<td>XR</td>
<td>XR</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6. Desiccated C</td>
<td>X</td>
<td>XR</td>
<td>XR</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Coconut</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Livestock</td>
<td>M</td>
<td>PC</td>
<td>PC</td>
<td>M</td>
<td>WP</td>
</tr>
<tr>
<td>8. Poultry</td>
<td>M</td>
<td>PC</td>
<td>PC</td>
<td>M</td>
<td>WP</td>
</tr>
<tr>
<td>9. Fish</td>
<td>X</td>
<td>XR</td>
<td>XR</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10. Logs</td>
<td>X</td>
<td>PC</td>
<td>PC</td>
<td>X</td>
<td>WP</td>
</tr>
<tr>
<td>11. Lumber</td>
<td>X</td>
<td>XR</td>
<td>XR</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12. Plywood</td>
<td>X</td>
<td>XR</td>
<td>XR</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>13. Tobacco</td>
<td>X</td>
<td>XR</td>
<td>XR</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>14. Cotton</td>
<td>M</td>
<td>PC</td>
<td>PC</td>
<td>M</td>
<td>WP</td>
</tr>
<tr>
<td>15. Fertiliser</td>
<td>M</td>
<td>-</td>
<td>PC</td>
<td>M</td>
<td>WP</td>
</tr>
<tr>
<td>16. Agricultural</td>
<td>M</td>
<td>-</td>
<td>MR</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Chemicals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Tractors</td>
<td>M</td>
<td>-</td>
<td>MR</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>18. Water Pump</td>
<td>M</td>
<td>-</td>
<td>MR</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>19. Agricultural</td>
<td>M</td>
<td>-</td>
<td>MR</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Machinery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Fuels</td>
<td>M</td>
<td>-</td>
<td>MR</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

a/ M = importable; X = exportable
b/ PC = price comparison; MR = tariff and indirect sales tax;
    XE = 0 or export tax
c/ Rice was importable prior to 1978 and exportable afterwards.
d/ WP = FOB export unit value; MP = CIF import unit value
e/ WP = farm price; WP = wholesale price
f/ FOB Thai 435% broken plus 10% mark-up for transport cost to our border.
g/ CIF import unit value in Hong Kong.
Table 2 presents the implicit tariffs for these major inputs. Except for irrigation, fertilizer and feeds, these are taken from the IPPP study (Medalla and Power 1979), based on the tariff and tax structure for 1974. Since the latter changed very little up to the early 1980's, it was felt that it adequately represented the protection structure for the present study.

The implicit tariffs for fertilizer and mixed feeds were computed from price comparisons, directly for fertilizer and indirectly for feeds. Because of the heterogeneity problem in comparing prices of mixed feeds, the implicit tariff was based on price comparisons of the major inputs. However, this implicitly assumes that the implicit tariff is passed on by the feed industry to the livestock and poultry industry.

For irrigation, the actual irrigation fee charged by the National Irrigation Authority was compared to an annualized accounting cost of irrigation investment.
<table>
<thead>
<tr>
<th>Inputs</th>
<th>Implicit Tariff (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fertilizer</td>
<td>10</td>
</tr>
<tr>
<td>2. Agricultural Chemicals</td>
<td>28</td>
</tr>
<tr>
<td>3. Hand Tractor</td>
<td>46</td>
</tr>
<tr>
<td>4. Four-wheel Tractor</td>
<td>24</td>
</tr>
<tr>
<td>5. Irrigation pump</td>
<td>46</td>
</tr>
<tr>
<td>6. Other Agricultural Machinery</td>
<td></td>
</tr>
<tr>
<td>7. Fuels, oils, and lubricants</td>
<td>51</td>
</tr>
</tbody>
</table>
Finally, effective protection rates (EPR) were calculated for some activities. These measure the effects not only of protection accorded the final product, but also take into account protection on the inputs into the activity. The former (if it is positive) acts as a reward; while the latter (again, if it is positive) acts as a penalty. The net effect is then on value added -- the difference between the values of output and inputs. Thus

\[
EPR_j = \frac{Y_j(1+T_j) - \Sigma a_{ij} Y_j(1+T_i)}{Y_j - \Sigma a_{ij}} - 1
\]

\[
= \frac{T_j - \Sigma a_{ij} T_i}{1 - \Sigma a_{ij}}
\]

where \(Y_j\) is value (in border prices) of output \(j\)

\(T_j\) is the nominal protection rate on \(j\)

\(T_i\) is the nominal protection rate on input \(i\)

\(a_{ij}\) is the aggregate value of inputs (in border prices) per peso of output

Note that the numerator in the first term on the right is value added in protected prices and the denominator is value added in border prices.

Since in agriculture the proportion of value of intermediate inputs to value of output is generally small (i.e., \(a_{ij}\) is small), the EPR is usually not very different from the NPR, \(T_j\). Estimates of effective protection rates for agricultural industries including a number of processing sectors pertain to the period from 1975. The reference date of the input-output data differ by industries depending on available farm/farm-level data. The detailed explanation of the nature and sources
of I-O data used is in the individual industry studies. In general, the project has used existing micro-level data from the Bureau of Agricultural Economics, the Special Studies Division of the Ministry of Agriculture, the International Rice Research Institute, and so forth. However, farm surveys have been conducted specifically for the project in corn, sugar, livestock, poultry and forestry sectors. For coconut oil, desiccated coconut, and other processed products, the input-output were based on the 1974 input-output table.

The estimation of EPR is relatively simple once the $T_j$'s and $T_i$'s are determined. The methodological problems and general procedures followed in quantifying $T_j$ and $T_i$ have been discussed above. In agriculture, the estimation of EPR is simplified by the fact that most intermediate inputs such as fertilizer, agricultural chemicals, etc., are common to agricultural industries.

EPR's can further be adjusted for the undervaluation of foreign exchange that the protection system defends to yield so-called "net effective protection rates," or NEPR's.

$$\text{NEPR} = \frac{\text{OER}}{\text{SER}} \left( \text{EPR} + 1 \right) - 1$$

where OER is the official exchange rate. In effect, all EPR's would be reduced in the range of 17 to 23 percent (following the estimates of Medalla, 1979) to get NEPR's.

It should be noted that DRC's and EPR's tend to be negatively correlated, since high protection is generally associated with relative
inefficiency. This assumes that the protection is needed, and is not just creating excess profits. If it is fully needed, and also if the market prices of primary factors equalled their shadow prices, DRC's and EPR's would be equivalent measures. For in that case DRC = \( \frac{W}{V} \) and EPR = \( \frac{W}{V} - 1 \), where \( W \) is value added in domestic prices (shadow and market) and \( V \) is value added in border prices. In fact, of course, protection is not always fully needed and shadow prices do not necessarily equal market prices.

Some Shortcomings

While the techniques described above for measuring comparative advantage and the protective effect (positive or negative) of price intervention policies are widely used and respected, they have a number of weaknesses, the most important of which we will attempt to summarize in this final section.

First, and most important, is the fact that both DRC and the various measures of protection are of a partial equilibrium nature. That is, they do not take into account the many repercussions throughout the economy that are set in motion when price intervention is initiated, or when an industry judged to be comparatively advantageous is induced to expand. These repercussions include changes in relative prices of goods and primary factors, substitution among inputs on the supply side, as well as among outputs on the demand side, changes in interest rates and foreign exchange rates, and so on, all of which may come back to render the final result quite different from what would have been predicted on
a *ceteris paribus* assumption. To capture these effects would require a
general equilibrium model of the Philippine economy — something that is
not yet available. The only element of general equilibrium in our analy-
is represented by the estimation of the difference in the foreign exchange
rate that results from the entire protection system. This is important,
but it falls far short of capturing all of the general equilibrium effects.

*How serious is this shortcoming?* If we are looking only at a simple
project, or even a single industry, the initial impact will be very small
in relation to the totality of the economy and repercussions can be safer
ignored. If, however, we are considering the whole economy or even several
important agricultural industries together, we must assume that the
repercussions will be important.

The implication is that we must interpret these measures with great
care. It was noted above that the fact that most agricultural activities
show DRC's less than the SER cannot be interpreted to mean that all should
expand together. The repercussions on the price of land would be sure
to render some disadvantageous. That is why it was suggested that the
agricultural DRC's be compared with each other, instead. Then one,
or a few, could be selected for expansion while a counterpart few would
be indicated for contraction.

It is important, therefore, to be aware that the DRC's indicate
comparative advantage only at the margin and may be misleading if large
cchanges occur that would lead to substantial repercussions. The gener-
rule is, then, that DRC is a good indicator for changes that would be
small in relation to the whole economy — a single industry expanding, or
several expanding only slightly.
The same consideration is important in interpreting measures of protection. The general presumption is that relatively high protection attracts resources for expansion and relatively low (or negative) protection has the opposite effect. So long as we are considering the case of one industry only, we can be quite confident of this result. When we are considering the effects of the whole protection system, however, we cannot be as sure because of the general equilibrium effects of price intervention across the whole economy. It is very likely that those with the highest protection have drawn resources and those with the lowest have repelled them. As we approach the middle levels of protection, however, we can be less certain because of possible counter-effects.

Another weakness that applies to effective protection rates is the assumption of fixed coefficients in production. If we allow for substitution the variance in our EPR measures would generally be less. That is, the differences in effective protection among industries may be somewhat overstated because of this assumption. The measured range of EPR values is so wide, however, that it is not likely that the overall picture is greatly affected by this assumption.

Finally, there is a whole range of assumptions about competition in goods and factor markets, homogeneity of products, elasticities of supply and demand, etc., that could be questioned. We have tried to be as realistic as is possible with respect to these assumptions, subject to the need to keep the analysis manageable.
References


