In this paper, prepared for publication in a Festschrift in honor of Jan Tinbergen, the author evaluates alternative methods of project appraisal in developing countries with a view to their practical application. In particular, comparisons are made between methods involving (a) the use of the rate of return to capital and the domestic cost of foreign exchange criterion; (b) the inclusion of direct as against direct and indirect domestic costs in the calculations, and (c) the use of the shadow exchange rate and the Little-Mirrlees methods of valuing all goods at world market prices. Further consideration is given to the problems of project evaluation under alternative policy assumptions.

In preparing this paper, the author has drawn on discussions he had over the years in the Bank on problems of project evaluation. He further acknowledges helpful comments on an earlier draft by G.B. Baldwin, E. Lerdau, S. Reutlinger and D.M. Schydłowsky.

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PROJECT APPRAISAL IN DEVELOPING COUNTRIES

Bela Balassa*

The paper deals with some theoretical issues related to project appraisal in developing countries. It examines criteria for project appraisal under alternative policy assumptions: (a) optimal policies are applied throughout the economy; (b) nonoptimal trade policies are applied but these will give place to optimal policies by the time the project is implemented, and (c) nonoptimal policies will continue to be applied during the lifetime of the project.

In the discussion, consideration is given to the applicability of alternative methods of project appraisal. In particular, comparisons are made between methods involving (a) the use of the rate of return to capital and the domestic cost of foreign exchange criterion; (b) the inclusion of direct as against direct plus indirect domestic costs in the calculations; and (c) the use of the shadow exchange rate and the Little-Mirrlees methods of valuing all goods at world market (foreign) prices. Problems relating to the estimation of the shadow wage rate and interest rate and the difficulties of the practical application of project appraisal methods are raised but not discussed.

Project Selection under Optimal Policies

Assume initially that there are no external economies or market distortions in a country's economy and that transportation costs in foreign trade are nil. If the country in question cannot affect world market (foreign) prices, the adoption of a policy of free trade would entail equating the domestic
their
prices of all products to foreign prices and this would simultaneously ensure
the maximization of national income and equilibrium in the balance of payments.
If, however, the country affects foreign prices through trade, domestic prices
should be equated to marginal revenue from import substitution or exporting by
the use of an appropriate set of import tariffs and export taxes.

Under the stated assumptions, the described policies will be optimal
in the Pareto sense 1/
and the market prices of primary factors (e.g., labor, capital, and foreign exchange)
will equal their opportunity cost or shadow -- in Tinbergen's terminol-
ogy, accounting -- prices. Project appraisal will then take the form of com-
paring returns to a primary factor in the project to its market price; a pro-
ject will be accepted if the former exceeds the latter when all other primary
factors are valued at their market prices. The outcome will be the same irre-
strictive of whether the calculation is made for one or another primary factor.
Should returns to a primary factor in a project exceed its market price when the
contribution of other factors is evaluated at their market prices, this result
will also obtain if comparisons are made in regard to another factor (Chenery,
1961).

Nor will it matter whether we evaluate a project on the basis of proces-
sing costs at the last stage of fabrication or combine costs at all stages of
domestic fabrication. This is because, with the market prices of all primary
factors being equal to their shadow prices, the cost of domestically-produced
inputs (the sum of payments to primary factors and the cost of imported inputs
used in their manufacture) will equal their cost in the world market.

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1/ Additional taxes and subsidies would be needed for attaining a welfare
 optimum in the presence of interpersonal and intertemporal income-
distributional or other noneconomic objectives. Notwithstanding their
importance, these will not be considered in the paper.
Consider next the case when the stated assumptions are fulfilled but non-optimal tariffs and export taxes (subsidies) are applied. Market prices of primary factors will now differ from the shadow prices corresponding to optimal policies. Tinbergen was among the first to suggest that in such an event projects be evaluated at shadow prices (1955). It will be assumed in the following that shadow prices derived from a general equilibrium model of the economy under the assumption of optimal policies are used in project appraisal.

If primary factors are valued at their shadow prices as defined here, the results will again be the same regardless of whether the calculation is made for one primary factor or another, provided that domestically-produced inputs are valued in the same way. However, the results will now depend on whether we combine costs at all stages of domestic fabrication or consider only the cost of processing at the last stage since the value of domestically-produced inputs will not generally be the same in the two cases. This can be seen if we compare the use of the domestic cost of foreign exchange and the effective protection measures in project appraisal.

The domestic resource cost measure, as originally defined by Bruno (1963), involves estimating the value of domestic resources (domestic value added) used directly and indirectly in saving a unit of foreign exchange through import sub-

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1/ As will be seen below, the use of these prices involves the assumption that optimal policies will be adopted by the time the project is implemented. The implications of the nonfulfillment of this assumption for project evaluation will be discussed subsequently.
stitution or earning it through exports. If we take foreign prices as given, this measure will equal the combined direct and indirect domestic resource costs incurred at various stages of fabrication, divided by the difference between the foreign price of the product and the foreign exchange cost of its direct and indirect inputs.

The domestic resource cost of foreign exchange is estimated by the use of a full-input-output method in the sense that we are travelling back in the input-output chain until a primary factor or an imported input is reached. Let us denote domestic resource costs (domestic value added) per unit of output at a given stage of fabrication valued at shadow prices by \( W_i \), the world market price of the commodity by \( P \), the value of imported inputs per unit of output by \( N_i \), and the elements of the matrix of direct and indirect input requirements by \( r_{ji} \). The domestic cost of saving or earning a unit of foreign exchange (2) for commodity \( i \) is shown in (1).

\[
B_i = \frac{\sum W_j r_{ji}}{P_i - \sum N_j r_{ji}}
\]

In turn, the effective rate of protection (2) is defined as the percentage excess of domestic value added in processing \( W \) over foreign value added \( V \) per unit of output. In the analysis of protection in existing industries, this

1/ In cases when the country can affect foreign prices through trade, the foreign exchange saving should be expressed in terms of marginal revenue. Formulas (1) and (2) will need to be reinterpreted accordingly.

2/ It is customary to express the denominator in terms of foreign currency. However, for the sake of comparability with the effective protection measure, I will reinterpret the formula by expressing foreign values in terms of domestic currency (i.e. multiplying the denominator by the actual exchange rate). The application to project evaluation of the domestic cost of foreign exchange measure so defined will mean that a project is accepted if \( B \) is less than one (i.e. the domestic cost of saving or earning a unit of foreign exchange is less than the shadow exchange rate).
is derived from data on the nominal rate of protection ($T$) of the product and its intermediate inputs and the world market (foreign) input-output coefficients for these inputs ($M$) as in (2). The same formula is used in project evaluation, but for a new industry the nominal rate of protection for the output will now show the difference between domestic and foreign prices that would be necessary to make the project profitable if labor and capital were valued at their shadow prices. The effective rate of protection under this definition will be a social effective rate as contrasted to a private effective rate that obtains when labor and capital are valued at market prices.

It can be shown that the domestic cost of foreign exchange measure equals unity plus a weighted average of effective rates of protection at different stages of fabrication -- the weights being the direct and indirect contribution of labor and capital to output under free trade conditions (Balassa-Schydlofsky).

1/ The nominal rate of protection is defined as the percentage excess of domestic over foreign prices; it will equal the rate of tariff if tariffs are the relevant measures of protection.

2/ The formula refers to the case when world market (foreign) input-output coefficients are used in the calculations. A modified formula is applied if we start out from domestic rather than world market coefficients (Gorden, 1971, pp.36-37).
1968). This is shown in $(j)$. 

$$(j) \quad B_i = 1 + \sum_j Z_i \frac{V_j r_{j,i}}{\sum_j V_j r_{j,i}}$$

It further appears that the two measures will give the same result in project evaluation under optimal policies since in this case inputs will not be produced domestically at greater than world market costs, i.e. the effective rate of protection is nil for all domestic activities. By contrast, the application of non-optimal tariffs and import taxes permits the domestic production of intermediate inputs that would be imported under optimal policies. The domestic cost of producing those inputs, with labor and capital used in their manufacture valued at shadow prices, will now exceed their world market cost; should this not be the case, the inputs in question would have been produced in the domestic economy under optimal policies.

Under these conditions a project that used inputs produced domestically under protection may be accepted if evaluated by the use of the effective protection measure and rejected if the domestic cost of foreign exchange were the criterion applied. This will be evident if we consider that the former values all domestically produced inputs at their world market cost while the latter values them at their domestic resource cost which exceeds the world market cost in the case of protected inputs. Expressed differently, while the effective protection measure considers only the cost of domestic processing at the final stage of fabrication, the domestic cost of foreign exchange measure also gives expression to the excess costs incurred in the domestic fabrication of intermediate inputs as well.
Direct and Indirect Costs

The effective rate of protection can be reinterpreted as a measure of the direct domestic cost of foreign exchange while combining costs at all stages of domestic fabrication provides a total measure of the cost of foreign exchange. The former will now give the same results in project appraisal as if we calculated the rate of return to capital using the appropriate shadow price for foreign exchange and labor under the assumption that all intermediate inputs are made available to the project at their world market cost. Thus, if the effective rate of protection of a project is less than zero (i.e. the direct domestic resource cost of earning or saving a unit of foreign exchange is less than the shadow exchange rate), the rate of return to capital will exceed its shadow price.

In turn, the (total) domestic cost of foreign exchange measure assumes that inefficiently-produced domestic inputs would be used in the project and values these at their domestic resource costs, measured at shadow prices of labor and capital. Here again, the outcome will be the same if we calculated manufacture of the rate of return to capital, including that used in the inefficiently produced domestic inputs. If the domestic resource cost of earning or saving a unit of foreign exchange is less than the shadow exchange rate, the rate of return to capital used in the final stage of processing and in the domestic production of intermediate inputs combined will exceed its shadow price.

Thus, for project appraisal it will not matter whether the calculation is made for one primary factor or another but under non-optimal policies the result will depend on the number of domestic stages of fabrication considered, i.e. on the valuation of domestically-produced inputs.

\[ \text{More precisely, the effective rate of protection equals the direct domestic cost measure minus one.} \]
This can be illustrated by an example. Assume that in a country the manufacturing of precision equipment involves the use of steel produced under protection while the fabrics used by the clothing industry are not protected. Assume further that the production of precision equipment is efficient in the sense that domestic value added equals value added under free trade conditions while the former exceeds the latter in the case of clothing manufacturing.

Using equations (1), (2), and (3), we can estimate the domestic cost of foreign exchange and the effective rate of protection for the commodities in question from the data of Table 1. The effective rate of protection will be 50 percent on clothing and nil on precision equipment but the ranking is reversed in terms of the domestic cost of foreign exchange measure that will be 1.2 in the first case and 1.4 in the second. It is apparent that the cost of foreign exchange is lower in clothing manufacturing -- a relatively inefficient industry -- than in the production of precision equipment because the material input of the former (textile fabrics) is produced at world market costs while the latter is penalized by the protection of the high cost domestic steel industry.

It follows that the ranking of activities according to the domestic cost of foreign exchange reflects the implicit assumptions that (1) all existing industries will be maintained, (2) the expansion of the output of any one industry will bring forth increased output of all domestic industries providing direct and indirect inputs into it (i.e., the direct and indirect marginal input coefficient of domestic resources and of imports taken to equal the corresponding average coefficient), and (3) costs in input-producing industries will continue at existing levels. However, the domestic costs of inputs may decline along methods the learning curve or through the application of large-scale production made possible by increased demand for the product. Also, the country may move closer to optimal policies in which case some of the inefficient industries will have
<table>
<thead>
<tr>
<th></th>
<th>Domestic production</th>
<th>Foreign production</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Processing costs</td>
<td>Foreign exchange</td>
</tr>
<tr>
<td>Clothing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fabrics</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Processing costs</td>
<td>6</td>
<td>-</td>
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<tr>
<td>Price</td>
<td>12</td>
<td>10</td>
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<tr>
<td>Precision instruments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Processing costs</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Price</td>
<td>14</td>
<td>10</td>
</tr>
</tbody>
</table>

\[
B_c = \frac{12}{20 - 10} = 1.2
\]

\[
B_p = \frac{14}{20 - 10} = 1.4
\]

\[
Z_c = \frac{6 - h}{h} = 0.5 \text{ (50 percent)}; \quad Z_f = \frac{6 - 6}{6} = 0
\]

\[
Z_p = \frac{4 - 4}{4} = 0; \quad Z_s = \frac{10 - 6}{6} = 0.67 \text{ (67 percent)}
\]

\[
B_c = 1 + 0.4 \times 0.5 + 0.6 \times 0 = 1.2
\]

\[
B_p = 1 + 0.4 \times 0 + 0.6 \times 0.67 = 1.4
\]

Source: Balassa-Schydowsky, 1968
to reduce costs to survive. Finally, even if an inefficient industry is maintained for the sake of non-economic objectives, inputs for new projects can still be imported.

In turn, in using the effective protection measure in project appraisal, each industry is evaluated on its own merits and one will not forego the establishment of an efficient industry because of high present costs in the domestic production of its inputs. This measure will require adjustments, however, if political pressures would entail the expansion of some inefficient input-producing industries pari passu with that of the user industries. But such cases should be judged on their individual merits rather than penalizing particular projects on account of all inefficiently-produced domestic inputs.

A related consideration is the definition of the project itself. In cases where two stages of fabrication are closely integrated, these may be combined for purposes of project appraisal and the effective rate of protection calculated on the combined unit. This will be the case for example if the construction of a paper mill is envisaged in order to utilize the output of a previously constructed pulp mill. But such cases too would have to be judged on their own merits, taking account of possible alternative sources of supply of the major input.

The Treatment of Nontraded Goods

Removing the assumption of zero transportation costs in foreign trade will entail the introduction of commodities which are not traded internationally. Transportation costs are analogous to tariffs in the sense that both increase the cost of importation and may result in the elimination of particular imports. From the point of view of project evaluation, however, there is an important difference between tariffs and transportation costs. As was argued be-
Therefore, the production costs of inputs produced domestically under non-optimal tariffs should be considered in judging a project in special circumstances only. By contrast, transportation costs are here to stay and a method has to be found for valuing inputs that are not traded because transportation costs make this prohibitive. Such products, generally including electricity, gas, water, construction, and various services, are customarily called nontraded goods.

Tinbergen was the first to suggest the use of a semi-input-output method in project evaluation in the presence of nontraded inputs (1963) while its application in estimating the effective rate of protection was proposed by Corden (1966). This method involves adding traded inputs used directly and indirectly in the production of nontraded inputs to the traded inputs employed directly in the production process and including the sum of direct and indirect value added used in producing nontraded inputs with value added in processing. 1/

The rationale of this method is that the cost of nontraded inputs to the national economy equals the cost of the primary factors and traded inputs used in their manufacture. 2/

---

1/ For the relevant formulas, see Balassa, 1971, pp. 321-23. — Note, however, that the application of this procedure assumes that nontraded goods are produced at constant costs. Should this not be the case, they should be valued at marginal cost at the output level under optimal policies.

2/ In practice, it is rarely necessary to travel back through the input-output chain until a primary factor or a traded input is reached because absolute magnitudes get smaller at every step. In the case of water, for example, we can estimate value added, the value of traded inputs, and that of nontraded inputs, say electricity, when the latter is further divided into value added, traded and nontraded inputs, and the nontraded inputs used in its manufacture allocated on the basis of their approximate value added and traded input content.
It should be added, however, that the existence of transportation costs will modify the calculations if a move from non-optimal to optimal trade policies leads to shifts from the import to the export category. If such a commodity is used as an input, it should be valued at f.o.b. prices prevailing under optimal policies rather than at c.i.f. prices. F.o.b. prices should also be used if the commodity in question shifts from the nontraded to the export category whereas in the case of a project that entails both replacement and exports, the amount produced for replacing imports should be valued at c.i.f. prices and the amount exported at f.o.b. prices. Finally, the evaluation of projects involving the production of commodities which are not traded under optimal policies necessitates taking account of domestic demand conditions in the form of consumer surplus analysis.

The Shadow Exchange Rate and the Little-Mirrless Method

I have assumed so far that shadow prices of primary factors are available from a general equilibrium model of the economy. As this is hardly the case in developing countries, a way has to be found to evaluate projects when the shadow prices are not known. Retaining the assumptions of perfect product and factor markets and no external economies, it may be suggested that if decisions extend to all potential projects and if distortions are due only to the application of non-optimal tariffs and export taxes (subsidies), projects be ranked according to their effective rate of protection, calculated by valuing labor and capital at their market prices, and available investment funds be used on the higher ranking projects.

The choice of this alternative can be rationalized on the grounds that export proceeds and import savings loom large in the computations and that the application of protective measures affects the exchange rate to a considerable extent (Bruno, 1972)

1/ In all cases, marginal revenue rather than prices should be used if the country can affect foreign prices through trade.
Its application, however, reflects the implicit assumption that protective measures do not affect the relative prices of labor and capital. Yet, to the extent that the imposition of non-optimal tariffs and export taxes (subsidies) entails a bias in favor or against labor-intensive or capital-intensive goods, relative factor prices will change. The extent of this bias could be measured, and adjustment for differences between the market prices and the shadow prices of labor and capital be made, only through a general equilibrium analysis of the national economy which raises formidable difficulties of estimation. At the same time, in view of the great variability of rates of protection among industries and the apparent lack of a systematic bias in favor or against particular factors of production in developing countries, the error due to the neglect of this adjustment may not be large (Balassa 1970).

Additional problems arise if project appraisal is limited to a single project or, at most, to a few. This is generally the case for an international agency as well as for countries where decision-making by public authorities extends to a small proportion of total investment or public decision-making on projects is decentralized. Project evaluation will now necessitate estimating the shadow exchange rate. This will, however, be subject to considerable error because of the uncertainties related to the values of the relevant elasticities. At the same time, often relatively small differences in the assumed elasticities can make or break a project.

To avoid this difficulty, I.D.M. Little and J.A. Mirrlees (1969) have suggested that all domestic costs be expressed in terms of world market prices and that the project be judged on the basis of its benefit-cost ratio calculated by using the relevant discount rate. This involves separating nontraded inputs in-

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1/ The information requirements of the shadow exchange rate include the value of exports and imports; the nominal rates of protection on traded goods; the domestic elasticities of import demand and export supply, as well as the foreign elasticities of export demand and import supply. The method of calculation is described in Balassa, 1971, Appendix A.
to their direct and indirect labor and traded goods components and valuing the consumption of labor used at the final stage of fabrication and (directly and indirectly) in the production of nontraded inputs at world market prices.  

The Little-Mirrlees method thus values the product and its inputs (traded and nontraded) at world market prices while the shadow exchange method values them at domestic prices. This is accomplished by expressing labor’s consumption in world market prices in the first case and converting the foreign value at the shadow exchange rate of traded goods into domestic prices in the second. The relevant conversion ratios are the average rate of nominal protection (for short, tariffs) on wage goods under the Little-Mirrlees method and the shadow exchange rate under the shadow exchange rate method.

It follows that the two alternatives will give identical results if the shadow exchange rate equals the average rate of tariff on wage goods. In turn, the shadow exchange rate method will give a more (less) favorable result than the Little-Mirrlees method in cases when the shadow exchange rate is greater (smaller) than the average tariff on wage goods. This can be seen from the examples of Table 2 where, for direct comparability, both project appraisal criteria have been expressed in terms of rates of return.

Assuming a production period of one year and a rate of discount of 9 percent, the project will be accepted using the Little-Mirrlees criterion in Case A (rate of return of 10 percent at world market prices) and rejected in Case B (rate of return of 6 percent under world market prices). The opposite

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1/ The method assumes that labor’s income is fully consumed.

2/ In practice, under the shadow exchange rate method, the adjustment takes place in two steps: (a) domestic values of traded goods measured at the existing exchange rate are deflated by the relevant nominal rates of protection, and (b) the values thereby obtained are "reflated" by the percentage difference between the shadow and the existing exchange rate which expresses the extent of overvaluation of the exchange rate as compared to the situation under optimal policies.
Table 2
ALTERNATIVE EVALUATIONS OF INVESTMENT PROJECTS

<table>
<thead>
<tr>
<th>Case A</th>
<th>Exchange Rate</th>
<th>Investment per unit of output</th>
<th>Price of Product</th>
<th>Material Input (a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>Depreciation</th>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>Labor</th>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>Profit value per cent of invest.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>80</td>
<td>120</td>
<td>(.50)</td>
<td>6.6</td>
<td>1.1</td>
<td>1.0</td>
<td>.2</td>
<td>110</td>
<td>22</td>
<td>22</td>
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<td>(.25)</td>
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<td>(.375)</td>
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</tr>
<tr>
<td>Domestic values deflated by tariff (pesos) 80</td>
<td>80</td>
<td>80</td>
<td>(.50)</td>
<td>6.6</td>
<td>1.1</td>
<td>1.0</td>
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<td>(.25)</td>
<td>(.375)</td>
<td>(.25)</td>
</tr>
<tr>
<td>Domestic values adjusted for overvaluation (pesos) (Shadow exchange rate) 100</td>
<td>100</td>
<td>100</td>
<td>(.50)</td>
<td>6.6</td>
<td>1.1</td>
<td>1.0</td>
<td>.2</td>
<td>110</td>
<td>22</td>
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<td>22</td>
<td>(.25)</td>
<td>(.375)</td>
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<td>(.375)</td>
<td>(.25)</td>
<td>(.375)</td>
<td>(.25)</td>
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<tr>
<td>Case B</td>
<td>Observe values in domestic prices under protection (pesos) 80</td>
<td>100</td>
<td>120</td>
<td>(.50)</td>
<td>6.6</td>
<td>1.1</td>
<td>1.0</td>
<td>.2</td>
<td>110</td>
<td>22</td>
<td>22</td>
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<td>(.25)</td>
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<td>Domestic values adjusted for overvaluation (pesos) (Shadow exchange rate) 100</td>
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</table>

Notes: (a) world market input-output coefficient
(b) price
(c) value
The differences in the results are explained by the fact that, following customary procedures, in the calculation under the shadow exchange rate method I have not adjusted labor's contribution to value added either for tariffs on wage goods or for the shadow exchange rate. However, such adjustments would need to be made in order to allow for the effects of protection on nominal wages. If this were done, the two methods would give the same result provided that all estimates were without error. The choice between them then becomes a practical question of possible errors in estimation.

I have noted that the adjustment for the shadow exchange rate involves considerable error on account of the difficulties involved in estimating the relevant elasticities. In turn, the application of the Little-Mirrlees method entails problems in treating the contribution of capital and land to the production of nontraded goods and that of land in producing traded goods; also, labor's consumption of nontraded goods needs to be divided into its labor and traded goods components. It may be suggested, then, that both methods be used in project evaluation and sensitivity analysis be applied to the results.

Policy Assumptions in Project Evaluation

In the event of evaluation at shadow prices calculated under the assumption that optimal policies are applied in the economy, a project will be accepted or rejected, depending on whether it would be profitable if optimal policies were adopted by the time of its implementation. But since the application of optimal policies is the exception rather than the rule in developing countries,

1/ D.B. Humphrey (1969) makes adjustments for the effects of protection on wages as well as on profits which has been neglected here. But he incorrectly assumes that the resulting increase in money wages would have cumulative effects through higher prices of traded goods.
this assumption raises questions as to the eventual adoption of optimal policies and the time pattern of policy changes. These can be looked upon as problems of the second best; i.e., should one use "first best" shadow prices in one part of the economy if decisions are based on a different set of prices elsewhere?

To begin with, in many developing countries project appraisal at "first best" shadow prices would mean that industrial projects subject to evaluation by national authorities or international agencies applying such a method (for short, public projects) would be put at a disadvantage as compared to private projects in the industrial sector which enjoys protection. Now, there may be a welfare loss to the country in question if rejecting a public project were to lead to private investment in the protected sector of the economy as in the case when the government fails to borrow on the capital market. Similar conclusions apply if an international agency refrained from lending on preferential terms because the project in question did not meet the test at shadow prices.

But even if there is no substitution between private and public projects or loss of preferential credits, the country may suffer a welfare loss if "first best" shadow prices are used in evaluating public projects although optimal policies are not adopted during the lifetime of the project. Take, for example, the case when the protection of the manufacturing sector entails discrimination against primary activities through high input prices and overvalued exchange rates. Primary exports will now be smaller than under optimal policies and the contribution of a project in the protected sector of the economy will

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1/ Identical considerations apply to the application of the Little-Mirrlees method that uses shadow exchange rates implicitly by valuing all commodities, including wage goods, at world market prices.
be understated if evaluated at the shadow exchange rate reflecting the application of optimal policies. Correspondingly, the net social benefits of saving or earning foreign exchange in the manufacturing sector will be underestimated.

These considerations suggest that, in making decisions on projects, account would need to be taken of the policies applied and of prospective changes in policies during the lifetime of the project. This would necessitate constructing time series values of marginal social costs and utilities and deriving the shadow prices corresponding to them (Schydowsky, 1968; Feldstein, 1970). If, for example, the alternative to the project is an investment in the private sector, the shadow exchange rate should be defined as the marginal domestic cost of foreign exchange in that sector. In turn, if the alternative is a reduction in investment or an increase in consumption, the marginal utility of foreign exchange will be the appropriate shadow exchange rate (Harberger, 1965). Needless to say, the information requirements of these calculations are formidable.

The Meaning of Optimal Policies

I have assumed so far that the agency making decisions on projects adopts a passive stance with regard to policies and that the implementation of the project has no feedback on the policies applied. But implementing a project that would not be viable under optimal policies will make the adoption of such policies more difficult by creating vested interests. Providing incentives to such projects will also tend to increase discrimination against other activities, thus leading further away from optimal policies.

A decision-maker with authority over policies and projects would have to take account of these effects as would, in the case of decentralized decision-making, the policy-making authority that provides policy assumptions to decision-makers on projects. Similar conclusions apply to an international agency whose acceptance of projects not viable under optimal policies may lead to postponing the adoption of such policies. This will be the case a fortiori for
an international agency with policy-advising responsibilities that could influence policies through the criteria applied in project appraisal.

It follows that decisions on project evaluation will have to depend on the assumptions made concerning the possibilities of affecting policy choices and this may often call for project evaluation under the assumption of optimal policies. The question is then how optimal policies can be determined. This question will be taken up for the case when there are dynamic external economies in the manufacturing sector, reflecting the skill-producing effects of manufacturing industries, their impact on the modernization of the economy and the advantages of establishing industries that are connected through input-output type relationships.

Ideally, shadow prices should now be calculated from a general equilibrium model incorporating external economies. But this would increase the data requirements of estimating general equilibrium models and as yet we have little information on the magnitude of the external economies associated with the expansion of the manufacturing sector. In practice, therefore, approximations would have to be used.

I have elsewhere argued that optimal trade policies would involve adopting optimal taxes on primary exports that face market limitations abroad and providing preferential treatment to manufacturing vis-à-vis other primary activities through the application of a tariff-export subsidy scheme. At the same time unless there is evidence that a particular industry brings more (or fewer) benefits to the national economy than do manufacturing industries on the average, identical incentives -- i.e. equal rates of effective protection -- should be provided within the manufacturing sector (Balassa, 1971, ch.5). This conclusion also
applies if the manufacturing sector receives special treatment because of
government preference for industry (Bertrand, 1970).

The question remains at what rate tariffs and export subsidies be pro-
vided to the manufacturing sector. The cost of these incentives to the national
economy, as well as the observed adverse effects of import substitution in devel-
oping countries, suggest that these rates be kept at moderate levels. While the
appropriate norm will differ from country to country, depending on the particular
circumstances of the situation, it may rarely be necessary to provide effective
protection to the manufacturing sector on a continuing basis in excess of 10-15
percent. Additional incentives could, however, be provided to new industries on
infant industry grounds on a temporary basis, preferably on a declining scale.

The described scheme may be implemented by accepting industrial projects
that are profitable if their effective protection does not exceed the norm selec-
ted for the particular country, with adjustments made in the case of infant in-
dustries. In turn, nominal rates of protection for the product would be set so
as to make the project profitable for the existing exchange rates and prices
which are themselves affected by the system of protection. These nominal rates
would be subsequently altered pari passu with changes in the system of protec-
tion.

Conclusion

I have considered in this paper questions relating to project appraisal
in developing countries under optimal policies and in the event that non-opti-
mal tariffs and export taxes are employed. But the conclusions can be extended
to cases where incentives are provided through credit, tax, or expenditure mea-
sures rather than through tariffs and export taxes. Also, we can introduce em-
ployment or income distribution in the welfare function without affecting the
basic conclusions.
Criteria for project appraisal were developed initially by assuming the absence of transportation costs, external economies, and market imperfections. The first two of these assumptions have been subsequently relaxed while retaining the last one. In developing countries, however, we often observe imperfections in both product and factor prices. In the first eventuality, monopoly or oligopoly positions permit firms to reap above-average profits; in the second, market and shadow prices of primary factors will differ even though trade policies are optimal.

In the case of imperfections in the market for products which are used as inputs in a particular project, an adjustment would need to be made for excess profits. In turn, imperfections in factor markets call for the use of shadow prices which would ideally be derived from a general equilibrium model. Barring this, approximations would have to be used. These have been discussed at length in the literature (Little-Mirrlees, 1969; UNIDO, 1970) and will not be taken up here. The problem of using, in the place of a single rate, different discount rates for calculating the present value of future consumption and the opportunity cost of capital, too, falls outside the confines of this paper.

It should be emphasized that imperfections in factor markets will not modify the conclusion that decision on the project is unaffected by the choice of the primary factor for which calculations are made, provided that all other primary factors are valued at their appropriate shadow prices. But as in practice shadow prices are not known without error, it is desirable to use alternative methods of project evaluation and provide a sensitivity analysis of each. This is the more important given the error possibilities of project appraisal which pertain to the determination of shadow prices of primary factors, the comparison of domestic and foreign prices of products, and the treatment of non-traded goods.

The Structure of Protection in Developing Countries, Baltimore, Md., The Johns Hopkins University Press, 1971.


