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IN SELECTING PROJECTS

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In recent years, considerable attention has been paid to the use of the domestic resource cost (DRC) criterion to determine socially profitable projects, especially in the government circle. This is mainly due to the growing urgency felt by most developing countries to industrialize rapidly and an increasing awareness among government planners of the need for more solid economic basis for selecting viable projects. In the process, questions regarding appropriateness and methodology of the DRC criterion arose. This short paper attempts to at least clarify the more basic issues.

We start by defining the concept of the DRC. Suppose a certain project produces a tradable good -- i.e., a good which is either exportable or importable. If the product is exportable, the project earns foreign exchange; if importable, foreign exchange is saved since otherwise, the product would have been imported. In producing the tradable good, the project uses domestic resources and foreign exchange to buy, directly or indirectly, tradable inputs. How much real domestic resources the project uses to earn or save net foreign exchange when it produces the tradable good is then a logical

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question to ask. This, in essence, is what the DRC of a project, or product, aims to measure. More formally, the DRC, related to a project or a product, is the amount of domestic resources, in shadow prices,[1] that is used to earn or save a unit of net foreign exchange from the production of a tradable good. In general, this can be represented as:[2]

$$DRC = \frac{\text{domestic cost per unit of product}}{\text{world price per unit of product less foreign cost per unit}}$$

What does such a measure indicate? Most importantly, it indicates the real rate of exchange between the peso and foreign exchange for the relevant tradable output. For example, if a proposed project will produce an importable good with a DRC equal to P, the society would, in effect, be "buying this good from the project" at the rate of exchange of P to one unit of foreign exchange. Alternatively, the society could have imported the good [at the official exchange rate, equal to, say, r]. This means, however, directly using foreign exchange which is usually held at a premium

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[1] Shadow prices are prices which reflect true values (or costs) of commodities. In the presence of market distortions, e.g., existence of monopolistic elements and those which are government policy imposed, these prices differ from market prices. Otherwise, the market price system should correctly reflect society's valuation of goods and resources.

[2] There are, of course, other computational forms of DRC, depending upon how data are available.

in LDCs, including the Philippines.[3/] If the premium placed on foreign exchange (that is indicated by the estimate of the shadow price of foreign exchange, SER) equals $(\frac{SER}{OER} - 1)$ then the society would, in real costs, be importing the good at a rate SER per unit of foreign exchange. Thus, it is obvious that the project is socially profitable (unprofitable) if P, the DRC measure, is less (greater) than the SER.

The advantages of using the DRC measure become apparent here. By setting the criterion that the DRC should be less than the SER for the project to be desirable, the BOP problem is explicitly considered. The DRC analysis would not only implement full costing of domestic resources but also take full accounting of direct and indirect use of foreign exchange. It can, therefore, be as accurate as possible in measuring net foreign exchange earned or saved and the real domestic resources used.

Let us illustrate the point further. Suppose a foreign enterprise is prospecting to invest in a certain project here which would produce an exportable good with world price equal to b. Furthermore, its input structure is given by 1 pesos of labor cost per unit of

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[3/] The reasons for this premium on foreign exchange are well-known. The first and second are fundamental, one related to the distortions arising from tariff protection, the other related to the distortion created by a BOP disequilibrium. The third involves some value judgement -- to consider foreign exchange as a merit want.

output, k_d pesos of domestic capital cost per unit, k_f dollars of foreign capital cost per unit, c_i dollars of direct imported input cost per unit, a_i pesos of tradable domestic input cost per unit, and n_i pesos of non-traded input cost per unit. There is then a direct net foreign exchange earning of $b - k_f - c_i$ per unit of output.

DRC analysis, however, should go one step further. For example, although the domestic market may be an immediate source of a_i worth of tradable inputs, the impact, at the margin, may be more imports (less exports) of these inputs and is thus an indirect foreign exchange cost. DRC analysis should, therefore, consider a_i as such. Specifically, the implicit foreign cost would be equal to $\dfrac{a_i}{1 + T_i}$, where T_i is the implicit tariff on the tradable input.

A very interesting question in project evaluation is the treatment of foreign investment. How should it be valued? The DRC gives a very useful insight to this question.

Suppose a project involves foreign investment. Then, there is an immediate inflow of foreign exchange. How would such apparent benefit be included in the DRC analysis? If there is a benefit or cost involved, then definitely, it should be included. Further consideration is therefore, necessary. First, the foreign investor expects profits throughout the project's lifetime. These profits could be reinvested, or repatriated. If profits are reinvested,

there is no immediate foreign exchange cost. Ultimately, however, the foreign investment will have to be payed back, whether through profit repatriation or direct pull-out of investment. Disregarding other problems related to MNCs, we could envision the project "repaying" the foreign investor a fair return. Now, if the DRC associated with the project equals P, it is clear that this is done at a real rate of exchange precisely equal to P. The question about whether the DRC is less or greater than the SER is again very relevant. If P > SER, we would actually be paying for the foreign exchange made available by foreign investment at a rate greater than the social price of foreign exchange.

We have, thus far, discussed the net foreign exchange earning or saving of a project. There is further insight in the consideration of the domestic resource part in the analysis. As in other project evaluation methodologies, e.g. internal rate of return (IRR) and net present value (NPV), the DRC could reflect other goals of the Society, e.g., improvement in income distribution, personal or regional.

Whether truly reflecting social costs and benefits or not, shadow prices of resources (e.g., labor, capital) could be estimated such that the national objectives are taken into account. For example, an income distribution parameter d,[4] reflecting the premium that

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[4] The parameter d gives corresponding weights to costs and benefit accruing to different income groups. The simplest illustration is to simply distinguish between high and low income groups, the cut-off level being, say, the median income. If we set the high income group as the numeraire, d would be greater than 1. Benefits and costs accruing to low income group would be multiplied by this d parameter, i.e., valued more than those accruing to the high income groups. In this case, then, the premium on income distribution is $d - 1$.

the government (hence society) is willing to give on costs and benefits accruing to lower income groups, may be built into the shadow price estimates, specifically the shadow price of labor. A high d will lower the shadow price of labor, SWR. (See special paper on shadow price of labor in the Industrial Promotion Policies of the Philippines (IPPP) volume.)

Suppose that a project could locate in a progressive area A or in a depressed region B. The profitability is found to be higher in A without adjustment in shadow prices giving a premium on income distribution. Let the profitability in A be denoted by DRC_A and that in B by DRC_B. $DRC_A < DRC_B$. Suppose that $DRC_A < SER$ and $DRC_B > SER$.

The first best solution is to locate in A and effect a direct transfer of benefits from A to B enough to reach a desired level of income distribution. This way there is both an increase in national income and improvement in income distribution. There are, however, usually insurmountable political constraints to effect such a transfer. The government may then still decide to locate in B.

The decision should still be based on the social profitability of the project, but perhaps if income distribution is an urgent national goal, the DRC analysis should incorporate this goal via the use of an income distribution parameter.

There are two ways of looking at this problem. One way is to

have an idea of what the value of d should be and include this in the computation of SWR.[5/] The adjusted domestic resource cost, DRC_B' could be derived accordingly. If DRC_B' now becomes less than the SER, then location of the project in B is justified.

Another way to approach the problem is to find what value of SWR is needed to make DRC_B at least equal to the SER. This is equivalent to solving for SWR in

$$DRC_B = \frac{SWR + \text{other domestic costs}}{\text{net foreign exchange earning}} = SER$$

Suppose SWR' would make the DRC equal to SER. The associated value of d for this value of SWR' could then be derived. If this implied value is within acceptable range, then the project could justifiably be located in B.[6/]

In either case, there is some value judgment involved regarding how much premium should be reflected in d. Furthermore, the resulting wedge between SWR and the market wage implies a corresponding subsidy to labor. But at least their consideration becomes

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[5/] The parameter d could be included not only in SWR computation but also in valuing other benefits and costs which clearly affects income distribution. In most of these other cases, however, it is difficult to identify to which income groups costs and benefits really pertain. The discussion above thus simplifies the analysis by considering only the effect of d on SWR.

[6/] Note, however, that this may not be enough to induce private investors to locate in B.

explicit, and the government would know exactly the implication of a certain policy decision.

The DRC methodology, in summary, is then full costing and accounting of benefits to the society, in its ideal use. The profitability measure indicated by the DRC is a robust indication of social desirability.

A limitation of the DRC measure as defined earlier, however, can be seen. It is that the DRC as usually carried out, is static in nature. A project would usually last for many years. Costs and benefits could come in lumps, e.g., capital costs. Capital costs could, of course be annualized in terms of capital service. Benefits, however, would probably mass in the future. Productivity gains may not be able to be realized until later in the life of the project. How these benefits and other costs should be treated remains a problem. A solution would be to derive a DRC which could take into account dynamic gains of the project.[7] But perhaps a net present value

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[7]For example, DRC could be modified roughly as

$$DRC^* = \frac{\sum_{t=0}^{T} \dfrac{DR_t}{(1+i)^t}}{\sum_{t=0}^{T} \dfrac{NFX_t}{(1+i)^t}}$$

where
DR_t = domestic resource use in year t
NFX_t = net foreign exchange earned or saved in year t
i = discount rate
T = life of project

approach or the internal rate of return could more easily do this with proper discounting and costing of inputs and outputs. (This could depend upon what is considered the more important constraint e.g. saving or foreign exchange.)

Whichever project evaluation methodology is used would be another question (this will be dealt with in another paper). The really important task is correctly valuing the inputs, where serious problems could arise. A project necessarily, has some expectation of future prices. In particular, shadow pricing or intermediate inputs and outputs requires border prices. Thus, projections regarding these prices are very important. Grave errors in these projections could have significant effects on the profitability measure of the project. Thus, implicit in these expectations of the future is some idea of the risk involved in undertaking the project. If the risk is to be borne solely by the private investor, there is a natural check of being careful in assessing the costs and benefits of the project since private losses are at stake. If the government has to share some of the risk to compensate for the existing distortions, some discipline might be sacrificed. But this could be considered as a second-best solution. The first best solution would still be to correct the distortion at the source and let the private sector assume the risk as much as possible.