

SHADOW PRICES OF GOODS AND RESOURCES IN
THE PHILIPPINES: AN ASSESSMENT

Erlinda M. Medgala

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ABSTRACT

When market imperfections are present, which is often the case for the less developed countries including the Philippines, observable market prices do not usually indicate true valuations of goods and resources to society. An alternative method of valuation is thus needed in the economic evaluation of projects. This is the role of shadow prices --- prices which would reflect social costs and benefits and the use of which would lead to proper selection of projects and thus improved welfare.

This paper summarizes the existing estimates of shadow prices of goods and resources in the Philippines. These include a) implicit tariffs, b) the shadow exchange rate, c) the shadow wage rate, and d) the social rate of discount and the shadow price of capital. The methodologies and assumptions used in the estimation are explained. Moreover, some policy implications of the results are derived.

SHADOW PRICES OF GOODS AND RESOURCES IN
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Erlinda M. Medalla

A major task in the economic evaluation of projects is the valuation of goods and resources they use and produce. If markets function efficiently and freely, observable market prices should sufficiently indicate this valuation. However, especially in least developed countries (IDCs), market imperfections are usually present --- arising in part from genuine market failures such as the existence of non-competitive elements, externalities, et. al., but more pervasively from government policies themselves. In such cases, market prices are distorted and would not be the appropriate social valuation of goods and resources. An alternative method of valuation is thus needed, if true costs and benefits of a project to the society are to be reflected. This is the function of shadow pricing.

The purpose of this paper is to make an assessment of shadow prices of goods and resources in the Philippines. In particular, a summary of the more recent estimates for the Philippines of a) implicit tariffs, b) the shadow exchange rate or SER, c) the shadow wage rate or SWR, and d) the social rate of discount and the shadow price of capital, SPK, will be presented. A brief explanatory note on the methodology and assumptions used will accompany each estimate. Moreover, some policy implications of the results will be derived.

*Research Fellow, Philippine Institute for Development Studies.

Approaches to Shadow Pricing

There are basically two approaches to shadow pricing, hinging on the assumption regarding the existence of market distortions. To the extent that policy-imposed distortions are the most pervasive cause of the divergence between market and shadow prices, the first approach proposes that the appropriate shadow prices should be the equilibrium prices that would prevail if these policy-imposed distortions were removed. This is the view held by Tinbergen (1958) and, in the case of shadow pricing of foreign exchange, by Bacha and Taylor (1971). The implicit assumption is that these policies are purely distortionary and their removal would lead to the first-best optimum. However, if distortions arise for reasons other than the non-optimal government policies, e.g. the genuine market failures, the absence of first-best corrective measures is itself the essence of the problem of non-optimality. Thus, suspension alone of the distortionary policies is not enough. The move should be towards an optimal intervention system. In any case, this approach can be generalized to an attempt to estimate shadow prices associated with a first-best optimum. In this regard, such shadow prices are referred to as first-best shadow prices.

The second approach treats the present distortions as given, i.e., the distortions will remain during the lifetime of the project. The problem of shadow pricing then becomes one of deriving the dual solutions to the welfare of optimization problem, with the existence of the distortions as constraints. The optimization problem is usually not formally specified but it forms the conceptual framework for shadow

pricing rules. Advocates of this shadow pricing procedures are Little and Mirrlees (1959) and Dasgupta, Marglin and Sen (1972). The shadow prices so derived are referred to as second-best shadow prices in the sense that they represent social costs and benefits of inputs at the second-best optimum.

A crucial issue then in shadow pricing is related to policy assumptions, i.e. whether distortions are assumed to persist or not. It should be noted, however, that the first-best approach is not yet feasible for shadow pricing primary factors (i.e., labor and capital). Available data and techniques are still inadequate. Even the first-best estimate of the SER is limited to a partial-equilibrium analysis.

Estimates of Shadow Prices of Goods and Resources
in the Philippines

A project's input can either be intermediate or primary. In turn, the intermediate inputs, as well as the project's output(s), can either be tradable or nontradable. Primary factors, on the other hand, are usually treated as nontradables. Accordingly, the shadow price estimates are presented below for (a) outputs and intermediate inputs: tradable and nontradable, (b) foreign exchange, (c) labor, and capital.^{1/}

^{1/}The income distribution parameter is ignored since its estimation involves value judgement, which for the present cannot be sufficiently justified.

The most recent and comprehensive estimate of shadow prices for the Philippines (and perhaps, except for implicit tariffs for 1965 done by Power and Sicat (1971), the only estimates) are found in Bautista and Power (1979). These estimates are presented below, along with some explanation of the methodology used.

A. Outputs and Intermediate Inputs

1. Tradable Commodities

It is generally recommended by various studies including Little and Mirrlees (1969) and Dasgupta, Marglin and Sen (1972), that tradable commodities should be valued at their relative international prices even though distortionary tariffs and other taxes are present.^{2/} The rule does not depend on whether or not the distortion will be eliminated. The intuitive explanation is that the world market is always an alternative source or destination of commodities, and tariff revenues are mere transfers of funds (See Warr (1977) for more rigorous proof). Thus, the social opportunity cost of a tradable commodity should be its border price.

The shadow price estimates for tradable commodities (their

^{2/} It is clear that the first-best shadow prices for traded commodities should be their relative international prices. It is not so obvious, however, for the second-best case. Weckstein (1972) argues that international prices, which are essentially first-best in nature, are irrelevant second-best shadow prices. In reply, Dasgupta and Stiglitz (1974), followed by Boadway (1975), argue that international prices are the correct second-best shadow prices except when there is a government budgetary constraint. In a subsequent paper, Warr (1977) shows that neither of the cases argued by Weckstein and Dasgupta-Boadway implies shadow pricing traded commodities differently from their relative international prices.

respective border prices) are more meaningful if presented in terms of a proportional difference between domestic and border prices, i.e., the implicit tariffs. Besides acting as conversion factors between domestic and border prices, they carry in themselves important policy implications. (See discussion on policy implication).

If one lets T stand for implicit tariff, then,

$$T = \frac{\text{domestic price}}{\text{border price}} - 1$$

where both prices are in domestic currency terms.

To estimate T , two methodologies are apparent -- direct price comparison or its derivation from legal tariff and tax rates. Under perfect competition and identical quality conditions, they should yield the same results. However, when these assumptions are relaxed, estimates from the two methodologies often differ.

Due to possibilities of evasion, redundancy, and significant import control, direct price comparisons may be preferred. The Industrial Promotion Policies in the Philippines (IPPP) study, however, recommends the use of legal tariff and tax rates, except when homogeneity can be approximated, due to a considerable degree of heterogeneity of products. The argument is that protection afforded by a tariff may not completely be manifested in price differential but is effectively more important in its protection of the market share.

A summary of estimates of implicit tariffs for 1969 and 1974 is given in a table appended to Special Paper No. 2 of Bautista and

and Power (1979) and need not be presented here.

2. Nontradable Commodities

Two methodologies in shadow pricing nontradables are suggested in the literature. The first is the "foreign exchange equivalent" rule of Little and Mirrlees. Essentially, the method is to decompose nontradables fully into tradable and primary factors which are then valued at their international price. The second method is the "weighted average" rule by Boadway (1975) and Harberger (1969). The method determines the effect of a unit change in the public use (production) of the nontradable commodity on consumer and producer surplus. Warr (1977) shows that these rules are equivalent when there are no nontradable consumption goods. In any case, the problem of shadow pricing nontradables is one of determining specific conversion factors for each nontradable.

The merit of either method will not be discussed in this paper. What is crucial is the extent to which commodities are considered traded rather than nontraded. Little and Mirrlees, as well as Bautista and Power, recommend "leaning over backwards" to include commodities in the traded category.

There are no estimates of specific conversion factors for specific nontradables for the Philippines. The IPPP study, however, suggests a one-stage decomposition of nontradables whenever they contain major tradable components and recommends the use of the SER as a general conversion factor.

B. The Shadow Price of Foreign Exchange

In the IPPP study, the existing methodologies for measuring how much the SER has actually diverged from the OER which resulted from the distortion created by the protection are presented.^{3/} One measures the marginal social value of foreign exchange under the existing protection system (UNIDO method) while the other considers the free-trade equilibrium exchange rate as the shadow price of foreign exchanges (Bacha-Taylor method). An element of inconsistency in the UNIDO position arising from the assumption of continuing protection was noted. This relates to the fact that project evaluation is designed to bring out real comparative advantage and in the long run eliminates the need for protection other than that required by an optimal intervention system. On the other hand, modification of the free-trade assumption is suggested in the study to take into account various market failures likely to be present in an LDC. A model for estimating SER under the assumption of an optimal intervention system is thus formulated.

These approaches yield three different formulas for estimating the SER. The UNIDO method derives a simple weighted arithmetic average of implicit tariffs. The Bacha-Taylor method, on the other hand, gives a weighted geometric average of the same implicit tariffs. Finally, the model for estimating SER under the assumption of an optimal intervention system yields a weighted geometric average, also of the same implicit tariffs, but deflated by what they ought to be in the optimal inter-

^{3/}The case when there is disequilibrium in the Balance of Payment (BOP) is discussed in an appendix to Special Study No. 1 in Bautista and Power (1979).

vention system (See Special Study No. 1 in IPPP).

For all the three approaches, the ideal weights to use are the marginal imports and exports. Previous studies suggest using as proxies either actual levels of imports and exports or total domestic supply (i.e., $Q + M$ for importables and $Q - X$ for exportables, where Q is domestic production and M and X are imports and exports, respectively). The problem with the former weighting system is that it will produce a downward bias in the SER estimate since low tariffs will naturally be associated with high imports and high tariffs with low exports. Furthermore, it assumes uniform trade elasticities. The IPPP study thus recommends using the latter and innovates a second weighting system ($1.5 Q + M$ for imports and $1.5 Q - X$ for exports) which though still with limitations, the study argues to be employing far less stringent assumptions (See Special Paper No. 2 in IPPP). The study also notes that the SER estimate was not very sensitive, whether one or the other weighting system is used. The really important task is to be able to get good estimates of the implicit tariffs.

The SER estimates under the alternative policy assumption are calculated for the Philippines using 1974 data. Computation yields a value of 1.34 of the OER as the UNIDO "second-best SER estimate", 1.32 of the OER as the Bacha-Taylor estimate and 1.16 of the OER as the first-best estimate under the assumption of an eventual optimal intervention system. The wide gap between the first-best and second-best estimates implies that some projects viable at UNIDO shadow prices under protection would not be socially profitable under the optimal trade

regime. Thus, a careful choice between them is required. If projects could be finished without costs, the choice would be less critical. However, the study notes that there is lack of symmetry between the cost of starting and ending an enterprise. Thus, using an SER higher than the first-best optimal intervention involves a risk that enterprises whose vested interest may eventually stand in the way of the adoption of the optimal intervention system will be started. The study therefore recommends the use of the first-best SER in project evaluation.

C. The Social Opportunity Cost of Labor

The shadow price of labor is estimated only for unskilled category. Market wages for skilled labor are deemed to sufficiently reflect opportunity costs, the market for which is judged fairly competitive.

The process of estimating the shadow wage rate is mainly one of identifying the consequences of transferring labor to project employment. In the first instance, the use of labor by the project prevents its use elsewhere. The foregone output thus constitutes the direct opportunity cost. Second, due to higher wage in project employment, there is an increased consumption involved which could either be a cost or a benefit or both from the standpoint of the objectives of growth and equity. This constitutes the indirect opportunity cost.

The complete formula for the SWR used in the study is given by^{4/}

$$\text{SWR} = z \frac{L}{N} + (s - s_w) (w - z) (\text{SPS} - d) \\ - (1 - s) (w - z) (d - 1)$$

where z = marginal products of labor in agriculture

L = urban labor force

N = urban employment

s = economy saving rate

s_w = the worker's saving rate

w = market wage rate

SPS = the shadow price of saving

d = the income distribution parameter

The first term in the formula, $z \frac{L}{N}$, gives the direct opportunity cost of employing labor by the project since the impact of additional project employment is to induce rural-urban migration, thus foregoing output in agriculture. $\frac{L}{N}$ is what migration theories suggest to be the number of rural migrants per additional job created in the city.

The second term, $(s - s_w) (w - z) (\text{SPS} - d)$, indicates the cost of increased consumption due to decreased saving (workers are assumed to save less than average income earners).

Finally, the last term of the expression is the benefit arising

^{4/}The indirect cost of the disutility of increased effort called for in the new job is ignored, following the view that people want or should want productive employment rather than enforced idleness.

from increased consumption of the unskilled workers who belongs to the low-income group. A premium, indicated by how much it is greater than unity, is placed on costs and benefits accruing to low-income group.

There is thus, in using the SWR in project evaluation, a simultaneous consideration of growth and equity objectives. How SPS should be estimated is dealt with in Special Paper No. 3 in IPPP and is summarized below. There has been no attempt to estimate the parameter d and it will not be done in the paper. Its estimation requires value judgement, which for the present, cannot be adequately rationalized.

Results of the IPPP study for the SWR estimate are summarized in the table below.

Shadow wage rate estimates for the Philippines				
Year	z (per day)	Effective minimum daily wage rate, w	SWR	$\frac{\text{SWR}}{w}$
1969	3.26	6.60	5.10	.77
1974	5.39	8.80	7.58	.86
1977	9.28	16.84	13.73	.81

D. The Social Rate of Discount and the Shadow Price of Capital

Let i represent the social rate of discount

i_p , the private rate of discount

q_p , the private rate of return
and q , the marginal product of capital

Sen (1967) argues that when individuals act independently in their savings decision, each has a tendency to "free-ride" although each shares a common concern for the future generation, resulting in a sub-optimal level of saving and $i \leq i_p$. This is Sen's well-known isolation paradox. An additional distortion is created if the capital market is imperfect, resulting in a wedge given by $i_p \leq q$. Furthermore, if there is labor surplus and wage dualism (as indicated by a market wage exceeding SWR), $q_p \leq q$. Thus, $i \leq q$, as will be seen in the formulas for the shadow price of capital, SPK, given below, implies that $SPK \geq 1$, i.e., there is a premium placed on investment over consumption.

Assuming that capital employed in the investment considered comes entirely out of alternative investment, the formula for SPK is easily derived as

$$SPK = \frac{(1 - s) q}{1 - sq}$$

by solving for the present value of the future stream of consumption per unit value of investment (See Special Paper No. 4 in IPPP).

In estimating i , the IPPP study uses two methodologies, one representing an upper limit, the other a lower limit. The first uses the Keynes-Ramsey rule which assumes an optimal savings program.

An optimal consumption path implies equal marginal utility of

consumption for all time periods. This leads to the formula

$$i = \frac{q - n}{1 + n}$$

where n is population growth. Since an optimal savings program is assumed, this is considered the upper limit for i .

The second methodology used is the one suggested by Squire and van der Tan (1975), using the concept of elasticity of marginal utility of consumption with respect to changes in per capita consumption. This gives the formula,

$$i = gh$$

where g is the rate of growth of per capita consumption; and
 h is the elasticity of marginal utility with respect to per capita consumption.

The problem in the Squire and van der Tan approach is estimating n , necessitating making arbitrary assumptions regarding the form of utility function.

The IPPP study yields empirical estimates of i ranging from 9 to 12 percent using the methodologies. The estimate of SPK, on the other hand, ranges from 1.84 to 2.82.

Some Policy Implications of the Wedge Between Market and Shadow Prices

The implicit tariff estimates, aside from representing conversion factors between domestic and border prices, have important policy implications when used to estimate the effective rate of protection (EPR)

and the SER.

Results of the IPPP study show a highly uneven EPR structure, revealing highly protected inefficient industries and lightly protected (even penalized) efficient industries with regards to the SER. On the other hand, the estimate was significantly higher than the OER. This implies a general penalty on exports.

The first-best remedy is tariff reduction.^{5/} The Philippines is in the process of moving towards this direction. However, the process should take place gradually to alleviate reallocation costs. A question thus remains whether or not during the transition, some tariff compensation is required. The answer depends upon whether tariff compensation will increase or decrease welfare.

If (1) eligible industries could be correctly identified for tariff compensation and (2) the optimum level of tariff compensation can be quantified with some degree of confidence, then welfare would be improved. Otherwise, tariff compensation could potentially decrease welfare. Care should therefore be taken regarding these considerations.

The SWR estimate of 81 percent of the market wage indicates that a subsidy of 19 percent to employment be given. The problem is the source of financing and other political constraints.^{6/} Thus, perhaps, we should hold off recommendation of such subsidy for the present and

^{5/}Tariff uniformity is the ultimate goal.

^{6/}For example, many feel that labor could use this subsidy as a bargaining position to increase wages.

just urge the use of the SWR in project evaluation.

Finally, we come to the estimate of the SPK. The SPK estimate ranging from 1.84 to 2.82 implies a very radical recommendation of taxing the use of capital from 84 to 182 percent. This is, obviously, too bold to suggest.

The wedge between SPK and unity arises from 3 sources. First is the implicit assumption that the government is unable to raise savings directly, e.g., through fiscal policies. The problem of sub-optimal savings must therefore be faced at the project level. Denying this assumption and accepting that the government can enforce an optimal saving program (i.e., reducing the gap between i and i_p) by more direct means, would bring down the SPK to 1.84. Second, the elimination of the assumption of labor surplus and wage dualism (i.e., making $q_p = q$) would further bring down the SPK to 1.3.^{7/} The value of SPK can be further brought down to unity if we assume zero population growth (i.e., finally making $i = i_p$) and the capital market is perfect (i.e., $i_p = q_p$). However, the former assumption is unacceptable and the latter is unrealistic. Thus, the user tax on capital recommended by the IPPP study is reduced to 30 percent.

Implications on Need for Further Research

The above discussion points to basically two areas for further research. The first is with regards to getting more recent estimates

^{7/} These estimates are all taken from the IPPP study.

of shadow prices. The data base used was for 1974 (except for SWR which used 1977 data). The second is concerned with incorporating, when necessary, recent developments in the theoretical literature on shadow prices into the estimates. For example, Warr and Wright (1980) argue that the proper discount rate to use should still be the private rate of discount. This has implications on the estimates of both SPK and SWR.

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