

A COMPARATIVE WELFARE ANALYSIS OF THE DUTY DRAWBACK AND THE COMMON BONDED WAREHOUSE SCHEMES

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This study analyzes the private and social gains of two duty-free incentive schemes that are currently available to small- and medium-sized firms, namely the duty drawback and the common bonded warehouse schemes. Private and social criteria within the cost-benefit framework were constructed to evaluate the effects of the two schemes on a representative export firm.

At the firm level, the study finds that the common bonded warehouse scheme is superior to the duty drawback in effectively decreasing the cost of production and increasing profit. The study makes a modest attempt at evaluating the two schemes at the social level. With some qualifications, the common bonded warehouse scheme may also be socially superior than the duty drawback.

1. Introduction

It is no longer debatable that the long-run effects of import restriction, in the guise of protecting infant industries, tend to retard rather than accelerate overall economic growth. Analytically, this negative effect occurs owing to the implicit tariff on the exporting sector of the economy. "In the final analysis, therefore, protection acts as a tax on exporters; import-competing firms are protected at the expense of exporters" (Clements and Sjaastad, 1984).¹

The failure of protective policies for economic growth has compelled many developing economies to shift gears. The result has been a more liberal attitude towards export-oriented policies. Most of these policies take the form of fiscal incentives with the objective of attracting foreign investments. Studies indicate a high degree of correlation between the system of incentives and export growth rates and GNP (e.g. Balassa, 1978).

In the Philippines, incentive legislation has been collected in

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¹For an elaborate discussion on import restriction on industrial growth, see Power (1966).

two major laws namely, the Investment Incentives Act (RA 5186) and the Export Incentives Act (RA 6135).² These came in the wake of growing consciousness in the 1970s among both policymakers and businessmen, of the limits of the domestic markets and the increasing potential of export markets for manufacturers. During this period, the composition of Philippine exports shifted from agricultural and mining exports to nontraditional goods comprised mainly of manufactured products. In 1983, for example, the ratio of the value of merchandise exports to gross domestic product rose to 14 percent compared to 12 percent in 1967. The seventies also saw exports growing annually by 7.5 percent compared to the preceding period where export growth was a lower 4.2 percent (Medalla and Tecson, 1988).

This study focuses on the welfare effects of providing duty-free importation of raw materials inputs to small- and medium-sized firms through two import facilities: the duty drawback and the common bonded warehouse schemes. Some attempt is made to measure welfare changes in terms of private and social gains.³

Objectives of the Study

This study reviews the relative cost penalties arising from the two current duty-free import schemes of raw materials inputs available for small- and medium-scale firms, namely the duty drawback and the common bonded warehouse (CBW) schemes, thus providing a basis for firms to reassess their present status of being a registered or non-registered firm with the Board of Investments (BOI). The different measures used to calculate private and social gains all seek to assess the financial and economic aspects of the two schemes and provide bases for their improvement.

As a secondary objective, this study seeks to establish the

²Thereafter, several incentive laws have been passed. For a chronological presentation of these succeeding laws please refer to Manasan (1986) and Clarete (1992).

³Several studies on welfare effects of a policy change using household data employ the compensating and equivalent variations. The readers are referred to King (1982), Hause (1975) and Mohring (1971). The rationale for using profit as a measurement of welfare is that in terms of changes, a change in profit is the same as a change in producer's surplus.

limits for the rate of return to CBW operators, the limit being that rate which just equates the net benefits of the two schemes. This limit serves as a benchmark in determining whether current service charges do not countervail the objective of providing inputs at world prices to export firms.

2. Analytical Model

2.1. Assumptions

The country is regarded as being a price taker in the input market but confronting a less than perfectly elastic final demand for output. This allows input prices to be treated as exogenous variables so that changes in profits solely reflect changes in the volume of transactions. Graphically, this is represented by a horizontal input supply curve. On the other hand, the demand for output is taken to be downward sloping, implying a degree of product differentiation. The firm is taken to practice markup pricing for simplicity. These imply that the demand curve for the input is likewise downward sloping.⁴

Cost penalty comparisons between the two schemes do not consider changes in welfare in other sectors that facilitate in the trading transactions, such as customs brokers and financial institutions. This implicitly assumes that whether an importer courses his importation through a drawback or a bonded warehouse, these institutions serve the same purpose and in the same capacity, with the same amount of resources utilized. The relevant sectors in this study are the small- and medium-scale exporters, the operators of common bonded warehouses and the government. Exporters shall not be dichotomized into direct and indirect exporters; the zero-sum game nature of the transaction between the two sectors merely redistributes the costs and benefits of the duty-free schemes.

It shall also be assumed that all sectors are efficient so that costs resulting from inefficiency, e.g. storage costs, do not form part of the cost penalties. Accreditation and membership fees are also excluded from the analysis, since they are by definition fixed and invariate with respect to the volume of transaction, unless there is

⁴A formal proof showing the relationship between input- and output-demand elasticities is presented in the appendix.

ome kind of rationing of membership. Secondly, these fees are minimal in amount so that in terms of the average cost concept, they are negligible.

2.2. The Model

Starting from the free-trade regime, the imposition of a tariff on imports increases the price of imports by the amount of the duty, t . The relationship between the free-trade price, P_f , and the tariff-ridden price, P_t , is given by the following equation:

$$(1) \quad P_t = P_f(1+t)$$

Let r be the prevailing rate of interest. Then the discounted value of a rebate paid a period hence is $tP_f/(1+r)$. The rate of discount, r , represents the opportunity cost of the duty drawback. Let f denote the *ad valorem* filing fee which at the maximum is fixed at F . The discounted value of the filing fee is then equal to the $\min[f(1+t)P_f/(1+r), F/(1+r)]$. Under the drawback, the effective price of imports, P_d , is simply P_t net of these costs and is given by:

$$(2) \quad P_d = P_t - \{[tP_f - \min(f(1+t)P_f, F/M)]/(1+r)\} \\ = P_f \{ (1+t) - [t - \min(f(1+t), F/M)]/(1+r) \}$$

If the firm is small, then the minimum filing fee per unit, M , of imports is $f(1+t)P_f$. Then the effective price for the small firm is:

$$(3) \quad P_{d(s)} = P_f \{ (1+t) - [t - f(1+t)]/(1+r) \} \\ = P_f \{ [1 + (r+f)(1+t)]/(1+r) \}$$

For medium-sized firms, the filing fee is fixed at F . If the number of units demanded is M , then the per unit filing fee is F/M . Where M is large enough, F/M , the average filing fee approaches zero. In this case, the unit price for the medium-sized firm becomes:

$$(4) \quad P_{d(m)} = P_f \{ [1 + r(1+t)]/(1+r) \}$$

In comparison, importing through the common bonded warehouse scheme relieves the exporter outright from taxes and duties payable. Without transaction costs, this would effectively drive down price

to P_f . However, CBWs charge certain fees for their services, quoted as a certain percent of the total import value. In addition, CBWs charge a premium, b , on the bond posted as a guarantee for reexport. The value of the bond covers all taxes and duties that will have to be paid in case of failure to reexport the imported raw materials. Given these cost penalties, the effective price of inputs under CBWs is:

$$(5) \quad P_b = P_f(1 + s + bt)$$

The net price effect of either scheme is given by the difference between P_f and either (3), (4), or (5).

2.2.1. Derivation of the private profitability coefficients (PPC)

Private profitability is the change in profit of the private firm for every unit change in the amount of the imported input as a result of the cost-cutting effect of the duty-free import schemes from the previous profit position where inputs are levied a tariff. We designate the profit position of the firm under tariff as π_t , and those under the either scheme as π_s . A firm is defined as a small if the imported value of its inputs in peso terms is less than a million and medium if it exceeds a million pesos.

We assume that the demand for imports, M , has constant elasticity and is given by:

$$(6) \quad M = AP^\epsilon$$

where ϵ is the price elasticity of demand and A is some constant, while P is the effective price⁵. From (6) it is easy to see that:

$$(7) \quad (dM/M)/(dP/P) = \epsilon, \text{ a constant}$$

Profit, π , is simply the difference between cost and revenue. Cost in peso terms is just the cost expressed in dollars, PM , multiplied by the exchange rate. Let e_0 be the exchange rate in period 0; then the peso cost in period 0 is e_0PM . We assume that the firm's value added to the imported input is a certain v and that it takes one period for the firm to reexport the final output and claim the drawback. In

⁵This will be true, for example, if the elasticity of output demand and the elasticity of output with respect to the imported input are constant.

period 1, total revenue of the firm in pesos is simply $e_1(1+v)PM$, where e_1 is the exchange rate in period 1. Given that the interest rate is r , the value of total revenue in period 0 is $e_1(1+v)PM/(1+r)$. The discounted profit is then the difference between the two.

The change in private profit due to the scheme (DD, CBW) is graphically illustrated in Figure 1. D_m and D_x represent the demand or the imported input and output respectively. Since the firm practices mark-up pricing, D_x is shown as a shifted D_m . The supply curve with tariff is given by S_t . Given this situation, equilibrium in the input and output markets occurs at points B and A, respectively. Cost is then equal to area OP_tBM_t , whereas revenue is equal to area $(1+v)P_tAM_t$. Subtracting the cost from the revenue leaves profit equal to area $P_t(1+v)P_tAB$. The incentive scheme (= DD, CBW) shifts the supply curve to S_s which reduces the effective price to P_s . The new equilibrium points in the input and output markets are now respectively D and C. Following the same process, the new profit area is given by $P_s(1+v)P_sCD$. Private profitability of the scheme is then the difference between the two profit areas. S_f is the supply curve under free-trade.

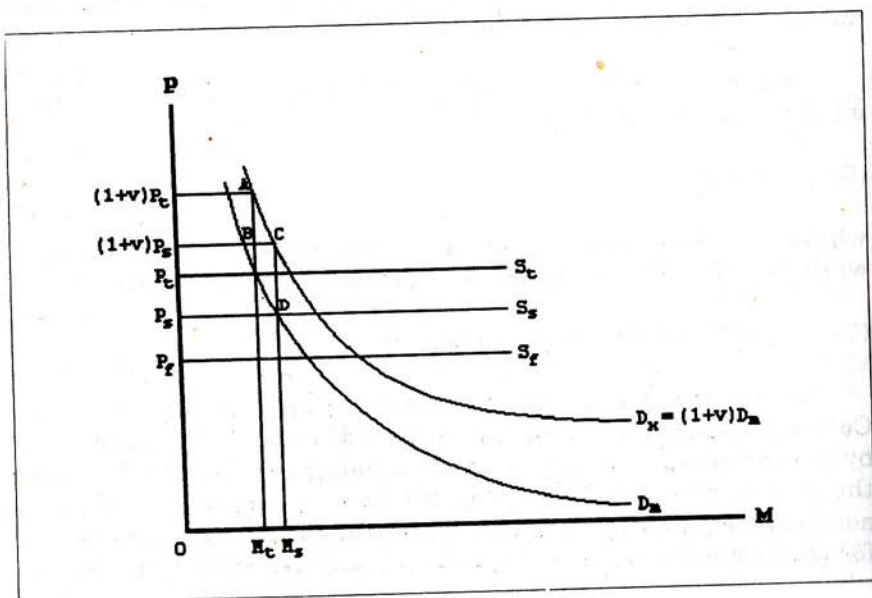


Figure 1 - Private Profitability of the Duty Drawback and the Common Bonded Warehouse

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In a two-period setting, the discounted profit of a firm is given by

$$(8) \quad \pi = e_1(1+v)PM/(1+r) - e_0PM \\ = [e(1+v)/(1+r) - 1] e_0PM$$

where $e = e_1/e_0$ is one plus the rate of currency depreciation. If a firm avails of either scheme, the change in profit is therefore given by:

$$(9) \quad \pi_s - \pi_t = [e_1(1+v)/(1+r)] (P_s M_s - P_t M_t) - \\ e_0(P_s M_s - P_t M_t) \\ = [e(1+v)/(1+r) - 1] e_0(P_s M_s - P_t M_t)$$

Now, suppose the following:

$$(10) \quad P_s = P_t + dP \text{ and therefore } dP = P_s - P_t \\ M_s = M_t + dM \text{ therefore } dM = M_s - M_t$$

For infinitesimal changes $P_s M_s$ is approximately equal to:

$$(11) \quad P_s M_s = P_t M_t + dP M_t + P_t dM$$

Substituting equations (11) and (7), equation (9) becomes:

$$(12) \quad \pi_s - \pi_t = [e(1+v)/(1+r) - 1] (1 - \epsilon) e_0 dP M_t \\ = [e(1+v)/(1+r) - 1] (1 - \epsilon) e_0 (P_s - P_t) M_t \\ = [e(1+v)/(1+r) - 1] (1 - \epsilon) e_0 P_s M_t - \\ [e(1+v)/(1+r) - 1] (1 - \epsilon) e_0 P_t M_t$$

where ϵ is the absolute value of the price elasticity of demand. Multiplying the first term by P_t/P_s , and using the definition of π_t , equation (12) can be simplified into:

$$(13) \quad \pi_s - \pi_t = [(P_s/P_t) - 1] (1 - \epsilon) \pi_t$$

The profitability coefficient in using either scheme is given by $[(P_s/P_t) - 1] (1 - \epsilon)$ which simply means that as the price of the

ported input decreases to P_s , the profit of the firm increases by this factor over what it could have earned under a restricted import regime.

2.2.2. Derivation of the social profitability coefficient (SPC)

The concept of social profitability addresses the changes in net benefit positions of all sectors in the economy as the regime changes from restricted to liberalized trade. The sectors relevant for this purpose are the export firms, the government, which loses tax revenues, and the warehouse operator who gains from servicing the input requirements of small and medium-sized firms. Their net benefit positions under different regimes are summarized below:

Sector	Trade Regime	Period	Cost(-)/Benefit(+)
Government	Trade w/ Tariff	0	$te_0P_fM_t$
		1	nil
	Duty Drawback	0	$te_0P_fM_d$
		1	$-te_0P_fM_d / (1+r)$
			$\min(fe_0P_f(1+t)M_d, F) / (1+r)$
	CBW	0	nil
		1	nil
CBW Operators	CBW	0	$-B, bte_0P_fM_b,$ $se_0P_fM_b$
		1	nil

where:

B : warehouse operator's cost in servicing its accredited members' import requirements.

Figure 2 illustrates the social benefit positions under the two schemes. To show the basic difference, we read off from the graphical analysis the probable difference in the effective price between the two schemes.

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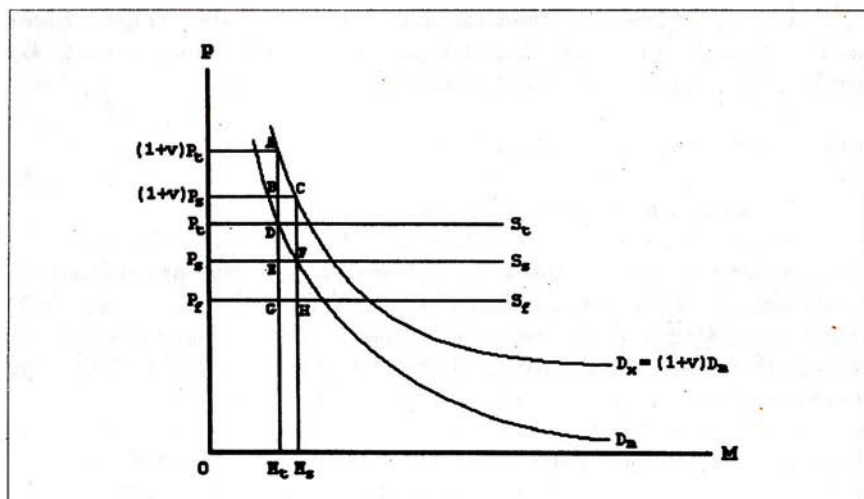


Figure 2 - Social Profitability of the Duty Drawback and the Common Bonded Warehouse

Under the drawback scheme, social profit is the sum of the private and social gains. Private profit/gain is as illustrated in Figure 1. Government's tax revenue when imports are fully taxed is given by area, $P_f D G P_f$. Social profit before the drawback is therefore equal to area $P_f (1+v) P_f A G$. When the government grants a drawback to the firm, its revenue becomes equal to the area $P_s F H P_f$ and the corresponding social benefit is then equal to area $P_f (1+v) P_s C H$. The difference between these two areas is the social benefit from the drawback. Alternatively, social profitability may also be illustrated by the difference between area $B C H G$ and area $(1+v) P_f A B (1+v) P_s$ which represent net gains and losses respectively.

On the other hand, the social gain under the CBW scheme is the sum of the exporters' profit and that of the bonded operator. Under the assumption that bonded warehouses are non-profit institutions (see below), the social gain of the CBW scheme reduces to the private profit of the exporting firm. Private profitability in this case is therefore the difference between area $P_s (1+v) P_s C F$ and area $P_f (1+v) P_f A G$. Equivalently, social profitability is the difference between area $E B C F$ and the two areas $(1+v) P_s (1+v) P_f A B$ and $P_f P_s E G$.

Let π_i^s , and π_s^s denote government revenues when import taxes are collected from firms and when scheme s is implemented. By definition, social profit is given by:

$$\begin{aligned} 14) \quad SP &= (\pi_s - \pi_i) + (\pi_s^s - \pi_i^s) + \pi_b^0 \\ &= (\pi_s + \pi_s^s) - (\pi_i + \pi_i^s) + \pi_b^0 \end{aligned}$$

A very important nature of CBWs is that they are non-profit institutions. This means that their revenues are just enough to cover operating and other expenses, hence, it follows that π_b^0 is zero. From this general formula, it is easy to derive the following expressions:

$$\begin{aligned} 15) \quad SP(DD) &= [e_1(1+v) / (1+r)] (1 - 1/\epsilon) P_i dM - e_0 P_i dM \\ &= \{ [e(1+v) / (1+r)] (1 - 1/\epsilon) - 1/(1+t) \} e_0 P_i dM \end{aligned}$$

$$\begin{aligned} 16) \quad SP(CBW) &= \{ [e(1+v) / (1+r)] - 1 \} (1 - 1/\epsilon) + \\ &\quad (t / [s + t(b-1)]) e_0 P_i dM \end{aligned}$$

As t approaches zero, the sign of the SPC is largely determined by the magnitudes of ϵ , r and v . In the limit when t is zero, implying free trade, then ϵ must at least be equal to unity and v must at least be equal to r assuming zero depreciation of the currency in order for the SPC to be positive. If t is some positive number and ϵ is less than unity, then SP is automatically negative. This tells us that for the social benefit to be at least unchanged, i.e., SP is equal to zero, the relevant export must face sufficiently elastic demand. This is so because the incentive program has an output-price cheapening effect via the reduction in cost. If the proportional increase in output is less than the proportional decrease in price, then the overall effect of the incentive program is a decrease in profit. To compensate for this effect on profit, the percent change in quantity demanded with respect to the percent change in price must be at least equal to unity.

2.2.3. Derivation of the tariff-compensating effect (TCE)

The two incentive schemes are designed to protect exporters from facing increased production cost and to make their outputs competitive in the world market. To find out how much each scheme

compensates the exporters for the profit-reducing effect of the tariff, I introduce the concept of the tariff-compensating effect. The tariff-compensating effect (*TCE*) provided by scheme *s* (= DD, CBW) is as follows:

$$(25) \quad TCE(s) = - [(\pi_s - \pi_t) / \pi_f] / [(\pi_t - \pi_f) / \pi_f]$$

The term $[(\pi_t - \pi_f) / \pi_f]$ in absolute value is the percentage reduction in profit from the free-trade level to a regime with tariff while the term $[(\pi_s - \pi_t) / \pi_f]$ measures the percentage increase in profit from the level with tariff due to the incentive scheme. *TCE* expresses the increase in profit due to the scheme as a percentage of the decrease in profit due to the tax. *TCE* therefore measures how much percent has the scheme compensated the profit-reducing effect of the tariff. We take the negative of $[(\pi_s - \pi_t) / \pi_f] / [(\pi_t - \pi_f) / \pi_f]$ to make the *TCE* value a positive number.

Using the information for profit above, it follows that:

$$(26) \quad TCE(DD) = - (P_d - P_t) / (P_t - P_f)$$

In particular, the *TCE*'s of small and medium firms are respectively:

$$(27) \quad TCE(DDs) = [t - f(1+t)] / t(1+r)$$

$$(28) \quad TCE(DDm) = 1 / (1+r)$$

The expression shows that the compensation afforded by the drawback scheme decreases as *r*, *f* and *t* rise for the small firm. On the other hand, the *TCE* of the medium-sized firm is only a function of *r*. Obviously, *r* and *t* can never be used as policy instruments that can be manipulated at will, to increase the compensatory effect of the drawback, since *r* affects all other sectors in the economy, unless a special rate is given to exporters for discounting. The repercussions of arbitrarily changing *r* might be so perverse as to outweigh the positive effect of the import schemes on the export sector. On the other hand, *t* is determined by the tariff structure and by GATT rules which cannot just be manipulated unilaterally. This leaves government two options to improve the drawback, and these are to reduce the filing fee to the barest minimum and/or substitute bonds for tariff payments as a security for reexport of the imported inputs.

By the same reasoning, $TCE(CBW)$ is therefore:

$$29) \quad TCE(CBW) = [t(1-b) - s]/t$$

The $TCE(CBW)$ is negatively correlated with all its terms. It may, therefore, be of interest if b and s can be kept to lower levels or increase the value of the TCE factor. As in above, t is not a policy instrument that can be disposed at hand, though it may be lowered through tariff reforms.

2.2.4. The equilibrium service rate

As mentioned above the equilibrium service rate is that rate which just equates the net benefits of the two duty-free import schemes. It is that rate which makes the two schemes equally attractive. This may be derived by equating either the private profitability equations or the tariff compensation equation, both reducible into:

$$(30) \quad \pi_d = \pi_b$$

Using the expressions for π_d and π_b , the equilibrium service fee is therefore:

$$(31) \quad S_{e(s)} = t(1-b) + [(f(1+t) - t)/(1+r)]$$

if the firm is small, and;

$$(32) \quad S_{e(m)} = t(1-b) - t/(1+r)$$

if the firm is medium-sized.

The equilibrium service fee is positively related with f and r , and negatively related with b , while the relationship with t depends on the relative values of f , r and b . If r is such that $1/(1+r)$ is smaller than b then the derivative of s with respect to t is positive and negative if the opposite holds true. If f , which is the filing fee for claiming rebates increases, the use of the duty drawback becomes more costly for the small firm. The same goes for r , which represents the opportunity cost of having to pay the tariff under the drawback scheme. This serves as a push factor for firms to switch to a CBW. As the demand for CBW increases, CBW operators will have a leverage to increase their service fees. b is a cost of using the CBW

so it is not surprising that an increase in b must be tempered with a decrease in s to keep down the total cost of using a CBW. Given the values of r , b and t , it should be noted that the equilibrium service fee for the small firm is higher than the medium-sized firm by the factor $f(1+t)/(1+r)$.

3. Results and Analysis

3.1. The Data

The analysis was carried out using the model developed on simulated relevant parameters. This was done by assuming a representative export firm with certain characteristics faced with the decision to choose between a duty drawback or a common bonded warehouse. The cost penalties associated with the two import schemes were assumed to take specific values close to actually existing rates. Unless specified otherwise, the following variables took these values: f is 1 percent, b is 1 percent, v is 30 percent and ϵ is 2. While the values for v and ϵ were assumed using industry sources for information, the figures of f and b were based on current charges. The filing fee rate may be considered a fixed variable as the government imposed this rate uniformly for all small firms. On the other hand, the bond premium rate varies from one CBW to another. A one percent bond premium rate was used here, since that is the rate currently charged by the Philippine Exporters Confederation — the largest CBW operator. The interest rate was allowed to vary from 5 to 20 percent as part of a sensitivity analysis of the attractiveness of the duty drawback. These rates may be viewed as ranging from savings to treasury bill rates. At the time this thesis was being written treasury bill rates stood at around 20 percent. To cover the largest body of bonded warehouses, the service rate, s , was allowed to range from 2 percent to 3 percent. This was to permit for comparison among bonded warehouses. The duty rates included in this study were limited from 20 percent to 60 percent. Additional rates yield no significant contribution to the analysis. Throughout the exercise, the exchange rate was assumed unchanged by setting the value of e equal to 1.

Although this study does not employ any statistical test or any industry standard for evaluating a change as significant or not, a 1 percent change or difference is arbitrarily adopted as the standard for a significant change. Although arbitrarily set, this is

ased on the notion that any change, no matter how small as long as it does not harm anybody, is Pareto optimal.

3.1.1. Private profitability analysis

At present, the relevant *TCE* values of the DD that warrants comparison with the CBW are those calculated at 20 percent interest rate (please refer to Tables 1.1 and 1.2). This is mainly because treasury bill rates have hovered around 20 percent for some years now. The other *TCE* values calculated at lower interest rates serve to caution exporters and warehouse operators regarding the other possibilities that can arise in case of interest rate restructuring.

Table 1.1 - Tariff Compensating Effects of the Duty Drawback Given Different Values of *r* and *t* (in percent)

	<i>t</i>									
	20		30		40		50		60	
	small	medium	small	medium	small	medium	small	medium	small	medium
0	89.52	95.24	91.11	95.24	91.90	95.24	92.38	95.24	92.70	95.24
5	85.45	90.91	86.97	90.91	87.73	90.91	88.18	90.91	88.48	90.91
10	81.74	86.96	83.19	86.96	83.91	86.96	84.35	86.96	84.64	86.96
15	78.33	83.33	79.72	83.33	80.42	83.33	80.33	83.33	81.11	83.33

Note: Filing fee rate is assumed to be 1%.

Table 1.2 - Tariff Compensating Effects of the Common Bonded Warehouse Given Different Values of *s* and *t* (in percent)

<i>s</i>	<i>t</i>				
	20	30	40	50	60
2.00	89.00	92.33	94.00	95.00	95.67
2.25	87.75	91.50	93.38	94.50	95.25
2.50	86.50	90.67	92.75	94.00	94.83
2.75	85.25	89.83	91.13	93.50	94.42
3.00	84.00	89.00	91.50	93.00	94.00

Note: Bond premium rate is assumed to be 1%.

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Based on our adopted standard, the shift from a duty drawback to a bonded warehouse seems warranted, especially for small exporters. At 60 percent tariff rate, 94 percent of the loss in profits due to the tariff is recovered by the firm, which is about 13 percent higher than what the drawback affords the small exporter and about 11 percent higher for medium firms. For firms utilizing a less expensive bonded warehouse the amount of compensation is even higher and the change from DD to CBW becomes even more beneficial. If by some policy action or circumstance the interest rates should fall to 5 percent level (a remote possibility but a possibility nonetheless), the advantages of using a CBW would be completely eliminated, except for those imports whose tariffs are higher than 50 percent.

Tables 2.1 and 2.2 present more clearly the minimum proportional increases of the profit of the firm as it moves from a tariff to a regime with drawback or bonded warehouse scheme. The minimum increase in profit has been defined as that increase in profit of the private firm that leaves the social profit at least unchanged (more on this point below). However, the two tables are not directly comparable, since each uses different elasticity values. To be directly comparable, the private profitability coefficient of the CBW (Table 2.2) was recalculated (please refer to Table 2.3) using the same ϵ values of the DD at 20 percent interest rate. The *PPCs* of the DD at 5 percent, 10 percent and 15 percent interest rates are also not directly comparable with the *PPC* values in Table 3.3 for the same reason. To do so requires recalculation of the *PPC*(CBW) using the ϵ_{\min} values of the DD at 5 percent, 10 percent and 20 percent interest rates, respectively.

As expected, there is a significant difference between the *PPCs* of the CBW and the DD. In fact the lower the s and the higher the t , the greater is the difference between the two. The difference for small firms (at $s = 2\%$) availing of the DD and those availing of the CBW as we move from 20 percent to 60 percent tariff is approximately 6 percent to 8 percent, and for medium firms about 3 percent to 6 percent. For CBWs charging higher s , the difference becomes smaller but is still significant by our standard. Stated differently, firms which avail of the drawback stand to lose this much profit compared to their CBW counterparts. For instance, a firm importing under a 60 percent tariff through a CBW which charges a 3 percent service fee earns an additional 48 percent profit while his small and medium counterparts using the DD scheme gain only 41 percent and 43 percent extra profit respectively.

Table 2.1 - Private Profitability Coefficients of the Duty Drawback Given Different Values of r and t (in percent)

	t									
	20		30		40		50		60	
	small	medium	small	medium	small	medium	small	medium	small	medium
5	30.72	32.68	34.50	36.06	35.81	37.11	35.93	37.04	35.44	36.41
10	34.06	36.23	37.42	39.11	38.29	39.68	38.04	39.22	37.24	38.27
15	38.21	40.65	40.88	42.74	41.15	42.64	40.42	41.67	39.25	40.32
20	43.52	46.30	45.05	47.10	44.47	46.08	43.11	44.44	41.48	42.61

ote: The elasticities and nominal incentive rates used are those derived in Table 4a and Table 1a, respectively.

Table 2.2 - Private Profitability Coefficients of the Common Bonded Warehouse Given Different Values of s and t (in percent)

s	t				
	20	30	40	50	60
2.00	49.40	52.20	52.10	50.67	48.79
2.25	48.70	51.73	51.76	50.40	48.58
2.50	48.01	51.26	51.41	50.13	48.37
2.75	47.31	50.79	51.06	49.87	48.15
3.00	46.62	50.32	50.72	49.60	47.64

Note: Elasticities used are the minimum elasticities of the duty drawback at 20% interest rate.

3.1.2. Social profitability analysis

The social profitability coefficients (*SPCs*) of both schemes are computed given the value of ϵ at 16 and ν at 30 percent (please refer to Tables 3.1 and 3.2). The *SPC* values of the CBW revolve around 1 percent and for inputs which tariff is below 40 percent the *SPCs* are not significant. In contrast, the *SPC* values of the DD are

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already large even at 20 percent interest rate and are even higher when r falls to 5 percent. The $SPC(DD)$ ranges from 18.23 percent to 39.06 percent at r equalling 20 percent and varies from 32.74 percent to 53.57 percent if r falls to 5 percent.

**Table 3.1 - Social Profitability Coefficients
of the Duty Drawback
Given Different Values of r and t (in percent)**

r	t				
	20	30	40	50	60
5	32.74	39.15	44.64	49.40	53.57
10	27.46	33.87	39.37	44.13	48.30
15	22.64	29.06	34.55	39.31	43.48
20	18.23	24.64	30.13	34.90	39.06

Note: Elasticity is assumed to be 16 and local value added, 30%.

**Table 3.2 - Social Profitability Coefficients
of the Common Bonded Warehouse
Given Different Values of s and t (in percent)**

s	t				
	20	30	40	50	60
2.0	0.79	1.04	1.16	1.23	1.28
2.25	0.69	0.98	1.12	1.20	1.25
2.50	0.59	0.92	1.07	1.16	1.22
2.75	0.48	0.86	1.03	1.13	1.19
3.00	0.37	0.79	0.98	1.09	1.16

Note: Elasticity is assumed to be 16, value added 30% and bond premium 1%.

A word of caution in the interpretation of the above results is in order before any conclusion can be drawn. First, the definition of the government's gains does not include any form of expenditures either in the administration of the drawback or on items for which the tax revenues are intended. If we assume, in the construction of the social profit equation, that the government always balances its budget, then government's profit is always zero. Hence social profit degenerates into private profits. But then the result becomes repetitive and uninteresting. Second, the government's gains do not incorporate the possible increases in the profits and income taxes collected as a result of the increases in the profits and incomes of the private firms and individuals who benefited from both schemes. Since the $SPC(CBW)$ is greater than the $SPC(DD)$, it can be inferred from this relationship that the increase in revenue from other forms of taxes will be higher under the CBW than under the drawback scheme. Third, our assumption that the profit of CBW operators is zero, on the grounds that CBWs are non-profit institutions, is an analytical simplification. In reality, CBWs do earn some form of profit. But we assume that whatever amounts they earn over their operating expenses are utilized for other purposes. These "other expenses" are deemed incorporated in the variable B of the π_b^0 equation. We assume zero profits for lack of knowledge about how much bonded operators actually earn as extra profits. In economic theory, extra profits are considered as "rent" to the fixed factor of production. Fourth, the drawback SP coefficient is likely to be overestimated because of reimbursement delays. The assumed "one-period" turnaround in the study appears too optimistic. Some industry sources speak of years before they are finally reimbursed. Lastly, our social profit equation is a simple summation of profits without any assignment of relative weights on the importance of the profit going to the private firms, the government and the bonded operator. If such weights can be constructed, then corresponding changes in the results can be expected. This study assumes equal weights for all sectors for lack of reason to do otherwise. Any arbitrary assignment of weights without sound bases would prove meaningless in any event. The SPC results can therefore be interpreted only within the confines of the model structure and assumptions from which these values are calculated. Rightly interpreted, the SPC reflects the social value of the scheme that minimizes the loss to the government. If a way can be found to fully compensate the government for the loss in tax revenues, then it can be reasonably argued that the weight or value of the loss is zero. Secondly, the objective of raising tax revenues as against expanding the export sector needs careful

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and balanced approach. One need realize the relative importance of the two. In the very short run, the implementation of duty-free import schemes imposes large losses to the government. For a cash-strapped government, providing duty-free importation is a hard pill to swallow. The deficit that immediately ensues from these schemes calls for some belt-tightening, if there are no other sources of revenues that can temporarily finance it. Just how large is the decrease in the overall revenue program must be seriously studied. In the long run, the schemes provide an overturn of the financial shock depending, however, on how fast the export sector responds to the given incentive.

2.1.3. Equilibrium service fee

Equilibrium service fee rates are tabulated in Table 4. It will be recalled that the equilibrium value of the service fee is defined as the value that makes the CBW scheme just as attractive as the drawback. This implies that the total cost penalties of the two schemes are equal, hence, it follows that a change from the DD to the CBW scheme produces no further improvement in the profit position at the private level.

Compared to the tabulated values (at r equals 20%), current service charges are way below the equilibrium rates. Though nothing can be deduced as to whether current charges are justified, they only suggest that there is a gain in shifting the import facility from the DD to the CBW. The difference between the amount and the

Table 4 - Equilibrium Service Rates for Small and Medium-Sized Firms Given Different Values of r and t (in percent)

r	t									
	20		30		40		50		60	
	small	medium	small	medium	small	medium	small	medium	small	medium
5	1.90	0.75	2.37	1.13	2.84	1.50	3.31	1.88	3.78	2.26
10	2.71	1.62	3.61	2.43	4.51	3.24	5.41	4.05	6.31	4.85
15	3.45	2.41	4.74	3.61	6.03	4.82	7.33	6.02	8.62	7.23
20	4.13	3.13	5.78	4.70	7.43	6.27	9.08	7.83	10.73	9.40

Note: Value added is assumed to be 30% and bond premium, 1%.

equilibrium rates may be viewed as a premium for using bonded warehouses. At lower interest rates, however, CBWs may be forced to restructure their service charges to remain viable.

4. Conclusion and Policy Recommendations

All told, the various criteria used in evaluating the two duty-free import schemes, at the firm level, point to the relative attractiveness of the common bonded warehouse over the duty drawback. This conclusion, however, depends critically on the prevailing interest rate or more generally, the time cost involved in availing of the duty drawback. The analysis has shown that at some levels of the interest rate, this relative advantage may be completely eroded except for some goods levied very high tariff rates. The sensitivity of the CBW's advantage over the drawback presents a strong argument for the service fee to be flexible. In the limit where interest rates are nil, the service fee may have to be brought down to near-zero levels too.

The above observation is important in two respects. First, in the current situation, the CBW scheme has been shown to be a more effective partner of export growth, a fact warranting the promotion of its use. Second, since this advantage is dependent on relatively high interest rates, the CBW's attractiveness, if reduced to this factor, may be temporary and artificial. If CBWs must be attractive however, they must be inherently so and should not rely on exogenous and unrelated variables. Even where the interest rates have come down however, CBWs may continue to be attractive if they extend their functions from just mere transit points for raw materials inputs to being export organizations with coherent objectives directed towards product development, market research and export promotions in the international markets. In such a case, service fees would be viewed not just as costs incurred to avoid high opportunity cost but something paid in furtherance to expansion and growth.

The above recommendations are important in the light of possibly lower interest rates in the future. We have seen that with lower interest rates, the drawback scheme appears superior to the bonded warehouse. This advantage of the DD at low interest rates may also be heightened if customs procedures in granting the drawback are simplified and improved. Two other factors that may effectively lower the transactions cost of the drawback are the

reduction of tariff rates as under EO 470 and currency appreciation. These four considerations qualify the advantage of the CBW scheme and suggest that they should extend themselves to some other functions that cannot be provided by the drawback system.

This study, however, has only made a modest proposal in evaluating the two import schemes at the social level. Several caveats regarding the interpretation of the social profitability results have been duly noted above. Since an ideal comparison involves the specification of a more realistic social profit function, the issue of whether the common bonded warehouse is Pareto superior to the duty drawback is therefore left open for future research.

A very important variable but whose significance is largely ignored throughout the analysis is the rate of depreciation of the currency. We assumed that the rate of depreciation is zero by taking the value of the e equal to unity. By mere inspection of the private and social profit equations, it is obvious that a depreciation of the exchange rate helps bolster the export competitiveness of firms. Manasan (1990) argues that "it is not enough to provide them with inputs at free trade prices. It is also necessary to compensate them for the undervaluation of the foreign currency that is engendered by the tariff system. This would require that the net effective protection rate of exports is made to equal zero by giving exporters tariff free inputs and allowing them to enjoy a free trade exchange rate. In this manner, exporters are given a truly free trade status".

Appendix

The Relationship Between the Input and Output Elasticities:

The inverse demand for imported input, $P(M)$, is taken to be downward sloping. We assume that the firm uses mark-up pricing of its output. The mark-up is incorporated in the local value added, v , which is a certain percent of the total value of imported inputs. For simplicity, we exclude the rate of discount, r , in the analysis. If $P(M) \cdot M$ is the total value of imported inputs, then $(1+v)P(M) \cdot M$ is the value of the final output.

Output, $Q(M)$, is a function of the imported input. The inverse demand for the final output, $P(Q(M))$, is negatively related with Q . So, if Q is the level of output and P is the price then the total value of production is $P(Q(M)) \cdot Q(M)$.

At any level of output, it must be true that:

$$(A.1) \quad (1+v) P(M).M = P(Q(M)).Q(M)$$

Differentiating equation (1) with respect to M we get:

$$(A.2) \quad (1+v)[M.P'(M). + P] = P'(Q).Q'(M).Q + PQ'(M)$$

where primed variables denote derivatives. Simplifying we get:

$$(A.3) \quad (1+v) P[M.P'(M)/P + 1] = P.Q'(M) [P'(Q).Q/P + 1]$$

$$[M.P'(M)/P + 1] = Q'(M)/(1+v)[P'(P).Q/P + 1]$$

From equation (A.1), equation (A.3) may be rewritten as:

$$(A.4) \quad [M.P'(M)/P + 1] = Q'(M).M/Q[P'(Q).Q/P + 1]$$

Now, the elasticity of input demand, ϵ , and the elasticity of output demand, η , are exactly the inverse of $M.P'(M)/P$ and $P'(Q).Q/P$, respectively. On the other hand, $Q'(M).M/Q$, is the elasticity of output with respect to imported input, δ . Using these notations, we get:

$$(A.5) \quad (1/\epsilon + 1) = \delta(1/\eta + 1)$$

Simplifying we have our desired relationship between ϵ and η :

$$(A.6) \quad \epsilon = \eta/(\delta + \eta \delta - \eta)$$

Note that in a special case where there are fixed production coefficients, then $\delta = 1$, and $\epsilon = \eta$.

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