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ON OPTIMIZING "GAINS" FROM
THE EXPORT BONUS SCHEME

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by

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The systems of exchange control and import licensing in Pakistan tend to favour import substitution at the expense of export expansion, since the limitation of import raises the domestic prices of import substitutes, thereby increasing the marginal profitability of (new) investment in import substitution industries as opposed to investment in export industries [1, 2]. The objective of the Export Bonus Scheme should then be to "correct", at least partially, the built-in allocative bias of the exchange control and import-licensing systems in order to increase the flow of domestic (new) investment resources into the export sector.

And this is what the Scheme has tried to accomplish by subsidizing investment in export industries. Under the Scheme the exporters are allowed to convert a specified percentage of their total export earnings (i.e., the "rate of bonus") into import bonus vouchers, which are mere entitlements to import. The exporters can either use these bonus vouchers themselves or can sell them in the open market to importers of goods that are allowed to be imported against bonus vouchers.^{1/}

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^{1/}The bonus-voucher holder must in addition secure an import license from the Chief Controller of Imports and Exports. However, with minor exceptions, import licenses are automatically issued against bonus vouchers.

However, the "effective" rate of exchange - i.e., the domestic price of foreign exchange - for the importer is raised above the official rate of exchange since these import bonus vouchers command a positive premium in the market because of the excess demand for imported goods at the current rate of exchange. At the same time, the height of bonus voucher premium multiplied by the rate of bonus determines the size of the export subsidy forthcoming the Export Bonus Scheme, since the effective rate of exchange for the exporter becomes more favourable than the official rate of exchange - that is the exporters, depending on the rate of bonus, receives from the monetary authority a higher price for the foreign exchange they surrender to the State Bank. Thus in effect the Export Bonus Scheme constitutes a devaluation of the domestic currency, with the difference that, unlike the latter the effective import rate is different from the effective export rate. (This is shown below.) The distinctive feature of the Scheme is that the transfer of financial resources (i.e., the subsidy) from the import sector to the export sector is accomplished wholly by the market - i.e., the export subsidy forthcoming under the Scheme is entirely "paid" out of the proceeds of the "tax" it imposes on imports.

The main contention of this paper is that, contrary to the commonly-held view, Export Bonus Scheme, as it now stands, tends to have the perverse effect of raising the marginal profitability of new investment in import - substitution industries more than in export industries. This is because it drives a wedge between the effective import rate and the export rate of exchange, with the former being always higher than latter. As a result the protective effects of the Scheme tend to outweigh its subsidy effects. It follows that the aim of the Scheme should not only be just to provide an adequate subsidy to the export sector. It should also seek to generate an incentives pattern that, other things being equal,

stimulates export expansion relatively more than import substitution.^{2/}
 For a positive export subsidy is only a necessary condition for stimulating domestic resources to flow into the export sector from other sectors of the economy. To ensure that resources do in fact flow into the export sector to the "desired" extent, the existing discrepancy between the marginal profitabilities of investment in the export sector and the import substitution sector must also be minimized, at any given level of export subsidy.^{3/}

The objection may be raised that the aim of the Export Bonus Scheme, as the government sees it, is not to stimulate investment into export industries; it is just to increase foreign-exchange earnings. This may well be true. However, the main point is that in the long run the export-promoting objective of the Scheme cannot be realized unless the resources do in fact flow in the "desired" direction. Also, irrespective of what the government's intention is, the Export Bonus Scheme does have important allocative effects. The main thesis of this paper is that these "effects" should not be inconsistent with the aims of government policy.

The discussion in this paper is divided into five sections. In the first section are set out the basic relationships of the Scheme with a view to highlighting the element of "choice" between the main policy instruments that the Government needs in order to realize the basic export-promotion objectives of the Scheme. In the second section are noted the basic relationships among the crucial variables of the Scheme. The analysis presented in these sections is then used, in the third section, to evaluate the effectiveness of policy measures that the

^{2/}In order to understand the significance of these remarks, it may be recalled that devaluation raises, to the same extent, the marginal profitabilities of investment in export and import-substitution industries relatively to industries producing for the home market. This is because, say, a 10% devaluation is, in effect, equivalent to a simultaneous 10% tax on imports and a 10% subsidy on exports. Thus devaluation raises by 10% the domestic prices of both the import and export goods above the prices of the non-traded goods. This stimulates a resource flow both to export and import-substitution industries from industries producing "non-traded" goods.

^{3/}This statement assumes that other domestic policies - i.e., fiscal, monetary and investment policies - of the government are consistent with the objective of stimulating a relatively bigger investment flow into export industries as opposed to other industries.

government has so far taken in recent years to increase the "operational efficiency" of the Scheme. In the fourth section are examined some of the possible objections to the line of argument pursued in the last three sections. The fifth section concludes this discussion.

The perverse effects of the Export Bonus Scheme on the allocation of domestic resources, noted in the last section, flow from the fact that it drives a wedge between the effective rate of exchange for the exporter and that for the importer. This is easily seen. Let r_m indicate the rate at which the importer can secure foreign exchange in the bonus voucher market; and r_e the rate at which the exporter can sell foreign exchange.^{4/} Then, by definition,

$$r_m = r (1+v). \quad \text{----- (i)}$$

$$r_e = r (1+bv). \quad \text{-----(ii)}$$

Where v is the average rate of premium at which import bonus vouchers are sold in the open market and b is the rate of bonus. It is then clear that r_m will be different from r_e so long as b and v are non-negative but b is less than 100 per cent.

This discrepancy between r_m and r_e has very important implications for the allocation of domestic (new) investment between import substitution industries and export industries. This is because while r_e represents a subsidy

^{4/} In fact, in Pakistan the exporters sell import bonus vouchers and not foreign exchange in the open market. No foreign exchange dealings are permitted in the open market in Pakistan. All foreign exchange must be surrendered to the State Bank of Pakistan. Under the Scheme, a specified part of foreign exchange is converted into import bonus vouchers.

on investment in export industries; r_m is a measure of the protection that the Scheme accords the investment in import-substitution industries. Now even a cursory look at (definitional) equations (i) and (ii) above will show that $r_m > r_e$ or $\frac{r_m}{r_e} > 1$, if $v > 0$ and $0 < b < 1$ will always be true. Since the Export Bonus Scheme satisfies both these conditions, it follows that it has a built-in bias in favour of import substitution as opposed to export expansion - the protective effects of the Scheme tend to be stronger than its subsidy effects on the allocation of domestic resources^{5/}. It follows that, in order to enhance the export-promoting potential of the Scheme, the existing differential between r_m and r_e must be made as small as is possible at any given level of export subsidy^{6/}, which is defined as the product of the average rate of bonus and the average rate of premium (referred to hereinafter as bv). In other words, the aim of government policy (in order to "strengthen" the Scheme) should be to decrease the ratio $\frac{r_m}{r_e}$ as far as possible. Now it can easily be shown that while an increase in 'b' (i.e., the rate of bonus) will decrease this ratio; a rise in v (i.e., the rate of premium) will increase this ratio.

^{5/} The protective effects of the Scheme, though not obvious, are important. For the higher price that the importer has to pay (in terms of domestic currency) for foreign exchange under the Export Bonus Scheme makes import activity less profitable by comparison with the import licensing system under which the importer gets foreign exchange at the (low) official rate of exchange. By the same token, it becomes more profitable to produce these goods at home, rather than import them from abroad.

^{6/} As shown below, while a given subsidy export subsidy could be secured either by increasing v with b held constant, or by increasing b while v constant, the protective effects of the former policy mix are greater than those of the latter.

From equations (i) and (ii) above,

$$\frac{r_m}{r_e} = \frac{r(1+v)}{r(1+bv)} = \frac{1+v}{1+bv} \quad \text{----- (iii)}$$

Differentiating partially with respect to b and v we get

$$\frac{\partial \left(\frac{r_m}{r_e} \right)}{\partial b} = -\frac{v(1+v)}{(1+bv)^2} < 0 \quad \text{----- (iv)}$$

$$\text{and } \frac{\partial \left(\frac{r_m}{r_e} \right)}{\partial v} = \frac{1-b}{(1+bv)^2} > 0 \quad \text{----- (v)}$$

Equations (iv) and (v) show that while $\frac{r_m}{r_e}$ decreases as b is increased, it increases as v is increased.

This result holds even if we allow for the fact that an increase in b will, ipso facto, induce a fall in $\frac{r_m}{r_e}$. This can be readily proved by differentiating $\frac{r_m}{r_e}$ totally. We get

$$d \left(\frac{r_m}{r_e} \right)_{b,v} = -\frac{v(1+v)}{(1+bv)^2} .db + \frac{1-b}{(1+bv)^2} .dv < 0 \quad \text{----- (vi)}$$

The result should be intuitively obvious, because by equation (iv) a fall in v also decreases $\frac{r_m}{r_e}$.

The significance and implications of this result can perhaps be more readily seen in terms of a simple diagram. In Figure I, the implicit rates of exchange facing exporters (r_e) and importers (r_m) are measured on the Y-axis; v , the rate of premium, is measured on the X-axis. The equation $r_m = r(1+v)$ is represented by a straight line AA' which has an intercept of Rs.5.00 (the official rate of exchange for \$1) on the Y-axis. Each point on the AA' line represents an implicit rate of exchange for the importer, indicated on the Y-axis. For instance, with $v = 100\%$, $r_m = \text{Rs. } 10.00$ for \$1.00 (Point F).

7/ This is because an increase in b will increase the supply of bonus vouchers. Given the demand for bonus vouchers in the open market, their price (that is, the premium at which bonus vouchers sell in the open market) will fall. (See Mathematical Appendix-1)

8/ This analysis is based on my earlier study [2]

The equation $r_e = r(1+bv)$, represented by a family of "rays" originating at point A on the Y-axis, corresponds to various bonus rates (b^S). Each point on one of these "rays" represents an effective exchange rate to the exporter, indicated on the Y-axis at given values of \underline{b} and \underline{v} . Thus with $b = 40\%$, $r_e = \text{Rs. } 7.00$ for $\$1.00$ (Point B).

A closer study of this diagram shows that $r_m > r_e$ if $b < 1$ will always be true at a positive rate of premium. For instance, if the rate premium (v) is 100% and the rate of bonus (b) is 40%, then $r_m = \text{Rs. } 10.00$ for one U.S. dollar (Point F), while $r_e = \text{Rs. } 7.00$ for one U.S. dollar (Point B).

It also shows that, with the rate of bonus (b) less than 100%, an increase in the level of premium widens the discrepancy between r_m and r_e . For instance, consider the "ray" Ab_2 , indicating $b = 40\%$. Now as \underline{v} increases from 100 to 150%, with \underline{b} kept constant at 40%, r_m increases from $\text{Rs. } 10.00$ (Point F) to $\text{Rs. } 12.50$ (Point N), but r_e crawls from $\text{Rs. } 7.00$ (Point B) to $\text{Rs. } 8.00$ (Point L) only, thereby widening the differential between r_m and r_e . This result is very important and needs to be noted by the policy-maker. (We produce empirical evidence about this aspect of the Scheme in section 4).

A look at Figure 1 also indicates the direction that government export policy should take in order to minimize the differential between r_m and r_e : This can be done only by pivoting the ray originating from point A on the Y-intercept in the direction of the line AA' - i.e., by successively increasing the rate of bonus towards 100%. (The possible objections to such a policy are considered in section 3 below.

The analysis in the last section highlights the basic element of choice that the policy-maker must reckon with in deciding upon a certain level of export subsidy. It must decide on the levels at which b and v must be fixed, since a given subsidy could be secured either by increasing b while holding v constant, or raising v while holding b constant.^{9/} This choice is most basic because, as shown above, whereas the former "policy mix" tends to decrease $\frac{r_m}{r_e}$ - i.e., it tends to emphasize export expansion relatively more; the latter "policy mix" tends to increase this ratio - i.e., it emphasizes import substitution relatively more.

Before we proceed further, let us consider the basic relationships that the policy-maker needs to reckon with in order to be able to make the above-mentioned choice. It can be shown (see Mathematical Appendix A-1) that all the basic relationships that needs to be considered in order to explain the structure of the Scheme can be expressed in terms of the following fundamental equation:

$$f \left[r (1+bv) \right] \cdot b = g (v, k). \quad \text{----- (vii)}$$

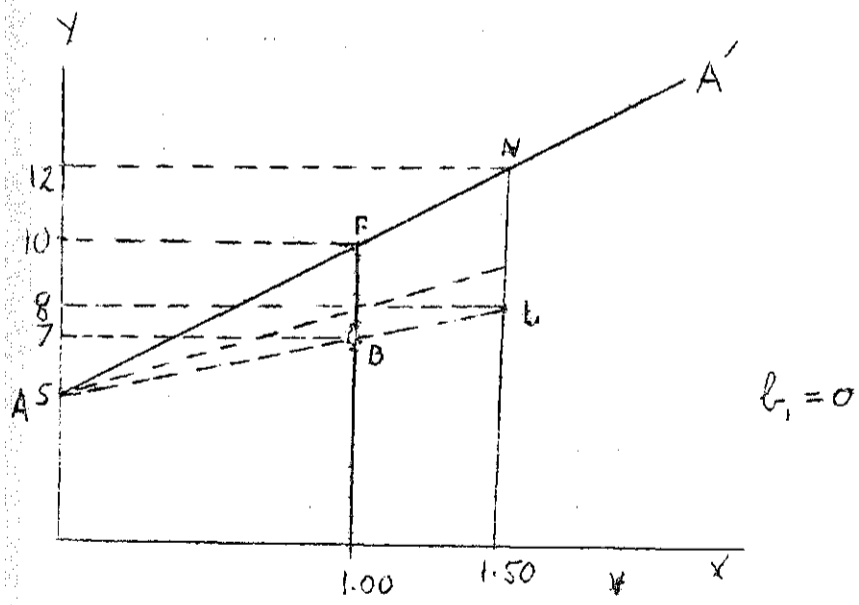
which is an implicit equation for v in terms of r , b and k , which stand respectively for the official rate of exchange, the average rate of bonus and the number of items that could be imported against import bonus vouchers, under conditions of free trade (See section 3 for details). The main assumption is that b , v and k can take only positive values.^{9/}

However, since the policy of the government has so far been to "freeze" r , we do not concern ourselves with it

^{9/}The basic distinction between b and v , the crucial policy variables of the Scheme must, however, be noted. Whereas b is a policy variable fixed by the government, v is determined by forces determining import trade and export trade.

^{10/}This assumption is only too reasonable, since so long as the Export Bonus Scheme is operative, v , b and k must be positive. For the Scheme assumes that there exists an excess demand for imports that cannot be satisfied by imports allowed by the government against "regular" import licenses.

Figure I
The Relationship Between the Rate at Which
Importers Can Buy (r_m) and Exporters
Can Sell (r_e) Foreign Exchange



any more in the ensuing discussion.^{11/} Thus, b and k are the crucial exogenous variables, whereas v is the crucial endogenous variable. Since k is an exogenous variable, a change in it can be represented by change in the endogenous variable v . Indeed, in the last section we implicitly assumed that an increase in v reflects an increase in k .^{12/} It follows that the government, in order to regulate the size of the export subsidy, bv , must manipulate either k or b or both.^{13/} It may be noted in this connection that while an increase in k tends to raise v , an increase in b tends to lower it. (See Mathematical Appendix A-2).

3

In fact, the government have used both k and b in order to influence the size of the export subsidy, bv , forthcoming under the Export Bonus Scheme. In this section we produce the empirical evidence on the use that government have made of k and b , the crucial variables of the Export Bonus Scheme. We then evaluate government policy in the light of our analysis in section 2.

The main thing to note about government policy is that, in order to increase bv , it has relied mainly on influencing v through an extension of the "bonus list" (k); rather than on increasing the rate of bonus (b), which has remained more

^{11/} However, it must be noted that the government could increase the export subsidy directly by raising r . v will then be zero (See Mathematical Appendix A-2).

^{12/} The Chief Controller of Imports and Exports maintains two separate lists, one of the commodities imported against import licenses and another of those imported against import bonus vouchers. Hence an "extension" of the bonus list - that is, an increase in k - takes the form of a "transfer" of some of the imported goods from the former list to the latter list. (However, see section 3 for details).

^{13/} The fixation of b and k is the most crucial task that government have to do at the beginning of each six-month shipping period. There are two six-months shipping periods, from January to June and from July to December.

or less unchanged (with the exception of 1967 when the average rate of bonus was raised considerably).^{14/}

The following table brings this out clearly.

Table I: Average Rate of Bonus and the Level of Premium (1961-67)

	Average Rate of Bonus (in Percentage terms)	Average Rate of Premium (in Percentage terms)
1961	20.84	121.00
1964	23.86	144.00
1966	22.98	153.60
1967	28.50	169.71

Source: Appendix-B

Note: The average rate of bonus in Column 1 has been calculated by expressing total bonus vouchers issued as percentage of total "bonus" exports.

Reliable direct evidence on the "extension" of the bonus list (k) is not available. This is because a mere increase in the number of commodities on the bonus list may not mean much for the level of premium. For, ever since the Scheme was introduced in 1959, government have replaced items for which there was not much domestic demand (but which were included in the original "bonus list", presumably on an experimental basis) by items for which considerable excess demand (e.g., sugar) existed. Moreover, with the passage of time, the number and value of licenses issued for each items, that are both on the "bonus list" and the "regular list" has decreased; while the number and value of licenses issued of items which are exclusively on the bonus list has increased. Obviously, these developments imply an extension (in depth) of the bonus list, even though the number of items removed may have been equal to the number of items added, leaving the total number of items on the bonus list unchanged. The following table

^{14/}The main factor responsible for this rise in the average rate of bonus is the rise from 20 per cent to 30 per cent since April 1967 in the rate of bonus on jute manufactures, the export of which constitutes about 35 per cent of total manufactured goods export under the Export Bonus Scheme.

shows that k has in fact increased considerably in the last few years, measured either by an increase in the total number of items or in the number of exclusive items.

Table 2: The Extension of list of items on Bonus Import List (1961-62/1965-66)

	Value in Rs. Million			
	Total Bonus Imports		Import Exclusively on Bonus List	
	Value (a)	No. of items (b)	Value (a)	No. of items (b)
1961-62	165.07	159	79.92	69
1962-63	200.64	166	86.94	78
1964-65	270.54	164	241.50	125
1965-66	327.60	181	254.58	127

Source: Pakistan Economic Survey

The implications of such a policy -- i.e., of mainly relying on an extension of k (which implies raising v), rather than on increasing b in order to increase the export subsidy, bv , -- for resource allocation can be readily worked out with the help of the analytical tools we have developed in section 1: that is we should calculate the relevant rate for the exporters and the importers and the differential of the two rates on the basis of the information given in table 1. We assume that v can be treated as a proxy variable for k . The results of this exercise are summarized in the following table.

Table 3: The Size of the Export Subsidy (bv) and the Discrepancy between r_m and r_e (1961-1967)

Year	b	v	bv	r_e $r_e=r(1+bv)$	r_m $r_m=r(1+v)$	$r_m/r_e - 1$
1961	0.21	1.21	0.25	5.94	10.50	76.77
1964	0.24	1.44	0.35	6.41	11.59	80.81
1966	0.23	1.54	0.35	6.41	12.07	88.07
1967	0.28	1.70	0.48	7.03	12.83	82.50

Source: Columns 1 and 2 taken from Table 1.

The data presented in Table 3 show that the Export Bonus Scheme has, on balance, provided relatively more incentive to import substitution than to export expansion, since the protective effects of the Scheme have continued to outweigh its subsidy effects: r_m has consistently been greater than r_e . Furthermore, as a look at the last column shows, the edge that the protective effects of the Scheme have over its subsidy effects got more pronounced during 1961-66 (see Column 6), thereby enhancing the profitability of new investment in import-substitution industries more than in export industries. However, during 1966-67, government policy took a turn in the right direction: b was increased from 0.23 to 0.28. As a result, even though r_m was still greater than r_e , r_m/r_e decreased from 88.30 to 82.50.

A closer study of Table 3 brings out an interesting aspect of government export policy. Consider the period 1964-66. During this period b remained constant. As a result r_e also remained unchanged. This was due to the offsetting movements in b and v -- i.e., while v increased, b fell. At the same time these offsetting movements in b and v increased r_m . As a net result, the ratio r_m/r_e increased. This shows that while the export subsidy forthcoming under the Scheme remained more or less constant yet the protective effects of the Scheme got still more pronounced during this period.

What, then, is the defence of this government policy -- i.e., relying mainly on raising v by increasing k , rather than on increasing b . Although there is no official "explanation" of the rationale of this policy, it is not difficult to guess what is it. It may be the (mistaken) belief of the government

that the objective of the Scheme is just to give, and increase it when needed, a subsidy to export industries. So long as this objective is achieved, so the official thinking may go, it does not matter how b and k are used, particularly because the alleged protective effects of the Scheme are either non-existent or too minor to be considered. (Total bonus imports were only about 8% of total imports in 1966).

Another defence of government policy may be that, even though the protective effects of the Scheme may be important enough to be reckoned with by the policy-maker, the government may not like to follow the "optimal" policy of increasing b (and k also). For, it may be argued, an increase in b involves surrendering control over a greater part of the country's total foreign-exchange earnings to the free forces of the market. The government may not like this to happen because the resulting composition of imports may not correspond to the one that it considers to be socially "desirable".

The first point - i.e., that the protective effects of the Scheme are insignificant - can easily be shown to be untenable. The fact that "bonus imports" constitute a mere 8% of total imports does not prove that the protective effects of the Scheme are negligible. For the relevant figure to consider in the present context is the percentage that each of the items included in the Scheme is of the total imports (bonus imports plus "license" imports) of that particular item. When it is recalled that of the 181 items on the bonus list (in 1965-66) 127 items, which accounted for 78% of total bonus imports, could be imported only against import bonus vouchers (see Table 2), it is easy to see that the protective effects of raising the prices of these items cannot be ignored. Also, of the items that are common to both the lists, imports against bonus vouchers are a substantial proportion of the total imports. Relevant data for the period

1959-1963 are set out in table 4 below. (Figures for the latter years are not available on a comparable basis).

Table 4: Imports against Bonus Voucher as a percentage of Total Imports (1959-63) by Main Commodity Groups.

Commodity Groups	1959	1963
Consumer	24.3	14.1
Raw Material for Consumer Goods	27.8	31.0
Raw Material for Capital Goods	8.1	9.1
Capital Goods	39.8	45.8
All goods	15.7	27.9

Source: Naqvi [1]

We now come to the second point noted above. The basic question really boils down to: whether the free-market forces can be relied upon to operate in the "socially desirable" way -- that is, in the way that the government considers to be socially desirable? Since the government policy (i.e., the "socially desirable" policy) has been to increase the proportion of capital goods and intermediate goods as opposed to consumer goods ^{in total imports} the real question that needs to be answered is: is there any reason to suppose that the free forces of the market will also yield about the same composition of imports? A more than casual empiricism suggests that such a faith in the free-market forces may not be entirely misplaced. A comparative study of changes in the composition of imports under "regular" commercial licensing and Export Bonus Scheme during 1959-63 shows convincingly that the composition of imports under both have been pretty much the same.

Table 5: A Comparison of Changes in the Composition of Imports under "regular" Licensing (Commercial Licensing only) and the Export Bonus Scheme (1959-63)

Composition of Import Licenses Issued	Regular Licensing (Only Commercial) Net % change in 1963 over 1959	Export Bonus Scheme Net % change in 1963 over 1959
Consumer Goods	+ 0.2	- 10.2
Raw Material for Consumer Goods	+ 2.0	+ 3.2
Raw Material for Capital Goods	-17.4	+ 1.0
Capital Goods	+15.2	+ 6.0

Source: Naqvi [1]

A similar comparison with imports under "industrial licensing"^{15/} establishes our point even more clearly.

Table 6: Changes in Import Licenses issued under Industrial Licensing 1957-63

Industries	Change in 1963 over 1957
Consumer Goods	- 23.8
Intermediate Goods	+ 2.2
Investment Goods	+ 21.6

Source: Naqvi [1]

It may be noted, parenthetically, that earmarking a part of country's total foreign-exchange earnings for "bonus import" does not imply that government have relinquished all control on the foreign exchange "retained" by exporters in the form of bonus vouchers. First of all, even if the government raises the rate of bonus to 100%, about 50% of total foreign-exchange earnings will still be under the direct control of the foreign-exchange authorities. (In 1966, bonus exports

^{15/}For details of these matters see Naqvi [1].

constituted about 50% of total exports. (See Appendix B-1). Moreover, the government will still exercise overall control on the foreign exchange "retained" by exporters (in the form of import bonus vouchers). For, the exporters will still be required to surrender all foreign exchange to the exchange-control authorities.

The main conclusions of this paper can now be briefly summarized. The main thesis of this paper is that, irrespective of what the government intention is, the Export Bonus Scheme exerts influence on the allocation of domestic (new) investment resources among alternative uses. It has been shown that, with the rate of bonus less than 100%, the Export Bonus Scheme, like the import-licensing system (although to a lesser extent), favours import substitution more than export expansion. Also, the policy of increasing the export subsidy primarily by increasing k rather than b has tended to widen this differential in the investment incentives implicit in the Export Bonus Scheme. Hence the objective of the Export Bonus Scheme is not only to increase the size of the export subsidy; it is also to reduce the discrepancy between the marginal profitability of investment in import substitution and export industries -- i.e., to reduce the ratio $\frac{r_m}{r_e}$, at any given level of bv . The main policy recommendation that has emerged from this analysis is that, in order to increase the export subsidy and reduce the ratio $\frac{r_m}{r_e}$, at a given level of export subsidy, government policy must primarily consist of increasing b . It follows that the reluctance of the government in the past to increase b (with the exception of 1967, when b was considerably increased) is inconsistent with the basic objective of the Export Bonus

Scheme which is to increase foreign exchange earnings. The point is that the logic of the Export Bonus Scheme must be fully understood and followed to the bitter end. It is only in this way that the "gains" from the Scheme can be optimized.

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MATHEMATICAL APPENDIX-AAppendix A-1: The Structure of the Export Bonus Scheme

The "structure" of the Export Bonus Scheme is best understood in terms of the following system of equations:

$$n^S = X \cdot b \quad \text{----- (i)}$$

$$X = f(r_e) \quad \text{----- (ii)}$$

where r_e is defined as

$$r_e = r (1+bv) \quad \text{----- (iii)}$$

$$n^d = g(v, k) \quad \text{----- (iv)}$$

$$n^S = n^d \quad \text{----- (v)}$$

$$b = \text{exogenously determined} \quad \text{----- (vi)}$$

$$k = \text{exogenously determined} \quad \text{----- (vii)}$$

$$r = \text{exogenously determined} \quad \text{----- (viii)}$$

Where:

n^S = the supply of bonus vouchers

n^d = the demand for bonus vouchers

X = value of exports of items receiving "bonus"

b = the rate of bonus (i.e., the percentage of their export earnings that exporters are allowed to convert into import bonus vouchers)

r_e = the effective rate of exchange for the exporter

v = the level of premium

k = the amount that could be imported under conditions of unrestricted trade (see section 4 for a detailed explanation of k)

r = the official rate of exchange

This simple system of equations gives all the basic relationships that needs to be considered in order to understand the inner "structure" of the Export Bonus Scheme. It tells us that: (i) the supply of bonus vouchers is a function of the value of exports (X) and the rate of bonus (b); (ii) the demand for bonus vouchers is a function of the level of premium (v) and of the list of commodities that are put on the "bonus list" (k); and (iii) the effective rate of exchange relevant for the

exporter is a function of the product of the rate of bonus and the level of premium.

Let us now study the properties of this system. It will be noted that in this system there are eight equations and eight unknowns, (i.e., n^s , n^d , k , b , v , r_e , X and r). It can easily be shown that of these eight variables we need to concern ourselves with the behaviour of only three variables, b , k and r . For once the value of these variables are fixed the values of the rest of the variables will also be fixed. To show this, set

$$n^s = n^d \quad \text{----- (v)}$$

Substituting equations (i) and (ii) into (v) we have

$$X \cdot b = g(v, k) \quad \text{----- (vi)}$$

Now again since

$$X = f(r_e) \text{ and } r_e = r(1+bv) \quad \text{---- (vii)}$$

the left hand side can be rewritten as

$$f[r(1+bv)] \cdot b = g(v, k) \quad \text{--- (viii)}$$

which is an implicit equation for v in terms of r , b and k .

It is assumed that b and k can take only positive values.

Mathematical Appendix A-2

Let us now see how the changes in k and b influence v .

A little mathematical manipulation will show that while an increase in k tends to raise v ; an increase in b tends to lower v .

Let us now rewrite our system of equations (i) to (vii) as follows:^{1/}

$$n^d = d(v, k) \quad \text{----- (i)}$$

$$n^s = S(v, b) \quad \text{----- (ii)}$$

$$\text{and } n^d = n^s, \text{ in equilibrium} \quad \text{-----(iii)}$$

(since r is given, the effect of a change in r on v will not be considered below).

We now wish to study the influence of changes in k and b on v . Since in equilibrium changes in n^d must equal n^s , we have

(Capital D stands for partial derivative).

$$dn^d = dn^s \quad \text{---- (iv)}$$

$$\text{where } dn^d = D_v \cdot dv + D_k \cdot dk \quad \text{---- (v)}$$

$$dn^s = S_v \cdot dv + S_b \cdot db \quad \text{---- (vi)}$$

Substituting (v) and (vi) into (iv) we have in equilibrium

$$D_v \cdot dv + D_k \cdot dk = S_v \cdot dv + S_b \cdot db \quad \text{----(vii)}$$

Rearranging terms

$$dv (D_v - S_v) = S_b \cdot db - D_k \cdot dk \quad \text{---(viii)}$$

$$\text{whence } dv = \frac{S_b \cdot db - D_k \cdot dk}{D_v - S_v} \quad \text{----(ix)}$$

Let us now first study the effect of change in k . For that we must determine the sign of $-\frac{D_k \cdot dk}{D_v - S_v}$ from (ix). Now we assume that $D_k > 0$; and that since the demand curve for bonus vouchers slopes downwards, $D_v < 0$. Thus the denominator is negative. But since there is a negative sign before the

^{1/} It is easily seen that equations (i) to (iii) here are comparable to (i) to (vii) in Appendix A-1. Equations (iii) and (i) are same: (ii) is also comparable with (i) because $n^s = X(r_e) \cdot b = f[r(1+bv)]$. Thus n^s can be expressed as a function of v and b . We assume that r is fixed.

expression the whole expression is positive. It follows that increase in k tends to increase v . Similarly, consider $\frac{S_b \cdot db}{D_v - S_v}$. We can show that since the denominator is negative the whole expression is negative -- that is an increase in b tends to lower v . (If we had also included r as an argument in (i) and (ii) it could easily have been shown that a change in r -- i.e., a devaluation -- will also lower v . As pointed out above as r is increased v tends to zero. When devaluation is large enough such that no excess demand for imports exists, v will, in fact, be zero.)

We now have all the basic information we need. We know that at a given rate of exchange (i.e., r constant), the government can influence v by changing the two principal policy instruments k and b . We have also seen that while an increase in k raises v , an increase in b will tend to lower it.

It may be noted here that whenever we speak of a rise in v , it is implied that k has been increased. Since k is an exogenous variable, a change in it can be represented by changes in the endogenous variable when we wish to study the effects of changes in exogenous variable on the export subsidy bv .

APPENDIX B

Table B-1: Total Exports, Bonus Exports, Bonus Vouchers Issued and Averaged Rate of Bonus

Year	Total Exports	Total Bonus Exports	3 as % of 2	Million of Rupees		
				Total Bonus Vouchers Issued	5 as % of 2	Average Rate of Bonus 5 as % of 3
1	2	3	4	5	6	7
1961	1905.0	724.2	38.02	151.2	7.9	20.86
1964	-	1007.9	-	240.5	-	23.86
1966	2860.7	1461.9	51.10	335.9	11.7	22.98
1967	N.A.	1498.3		431.50		28.80

Source: Figures in Columns 2,3 and 5 taken from Economic Survey of Pakistan

Table B-2: Total Imports and Bonus Imports

Year	Total Imports	Bonus Imports	3 as a % of 2
1	2	3	4
1961	3056.3	151.2	4.95
1964	4833.6	240.5	4.98
1966	4284.4	335.9	7.84
1967	5243.4	431.5	8.23

Table B-3: Average Rate of Premium

Year	Average Bonus Premium (in percentage terms)
1961	121.00
1964	144.00
1966	153.60
1967	169.71

Source: Economic Surveys of Pakistan and Monthly CSO Statistical Bulletins.

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