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EXPORT PROMOTION AS A DEVELOPMENT STRATEGY

By

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WP#1784-86 May 1986

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ABSTRACT

This paper has two aims. First it presents a model of the advantages of promoting exports. Second, it warns that in such a model, export promotion may be of benefit only to a limited group of countries. Encouraging others to become outwards oriented may be detrimental to welfare. The fact that, for the exporting sector to be viable, the scale of the exporting sector must be large relative to the optimal scale of exporting firms is advanced as the motivation for export promotion. I then argue that the scale of the exporting sector may, in equilibrium, be a signal of the export good's quality. Large capacities in the sector are required to convince importers to pay high prices. Such high capacities may effectively deter countries capable of producing only low quality goods from subsidizing exports.

I INTRODUCTION

This paper has two aims. First it presents a model of the advantages of promoting exports. Second, it warns that in such a model, export promotion may be of benefit only to a limited group of countries. Encouraging others to become outwards oriented may be detrimental to welfare.

It is widely recognized (see Bhagwati (1978), Balassa (1980) for instance) that less developed countries that have emphasized exports have grown faster than those who have continued to rely on import-substitution. Balassa (1980) says: "The evidence is quite conclusive: countries applying outward-oriented development strategies perfomed better in terms of exports, economic growth and employment than countries with continued import orientation". He, and many others, view the success of such outward-oriented economies as Korea and Taiwan worth emulating and recommend that those nations who are still clinging to import substitution change their ways.

It is important to point out at the outset that the policies followed by the successful outwardly oriented nations has not been to dismantle the edifice of tariffs erected by previous policies. Instead, they have added to this edifice various measures designed to promote exports. Thus, it is the export promotion itself which must have been the source of their new riches. This, in itself, is paradoxical in light of the standard 2X2X2 trade models. In these models, it is well known that export biased growth tends to worsen the terms of trade and can even lead to a loss in welfare (Bhagwati (1956)). Reliance on exports also leads to more exposure to the risk

of protectionism.

In fact, there has been little formal theorizing about the advantages of export promotion. Bhagwati (1978) stresses two ideas. The first is that countries with export promotion policies have fewer distortions. While this may be true, aggregate statistics like those in Balassa et al. (1982) undoubtely mask considerable variations in incentives across individual products and industries. The second is that capital inflows are easier to obtain when following an outwards oriented strategy. Yet, of the outwards oriented countries, foreign capital inflows appear to have been important only in Korea. Now, Korea may well have a debt problem.

Section II of this paper presents a different rationale for export promotion. It rests on the notion that exports may only become profitable when they are carried out on a scale larger than the one that is optimal for a single firm. There is then an externality: one firms' increase in exports makes other exporters more viable. The effects of this externality can be mitigated with export subsidies. This model could in principle be used to argue that all countries should subsidize exports. Yet, one must be suspicious of this recommendation given that so many countries have chosen not to subsidize their exports even after seeing the same data as Bhagwati (1978) and Balassa (1980).

I think it is at least plausible that those countries that have chosen not to subsidize their exports have done so in the pursuit of their own self interest. Thus the model I present has the feature that for certain countries, exports would not be profitable even in relatively large scale. The model also seeks to explain the determinants of the relatively large scale that must be built up

before export industries become viable even in those countries in which exportts are ultimately succesfull. It shows that the capacity installed in the export sector may serve as a signal (in the sense of Spence (1973)) of the quality of the exportable good. Countries intrinsically unable to produce good quality products would be willing to subsidize a small amount of capacity in the export sector to mask themselves as good quality producers. Then, at least temporarily, they would obtain high prices for their products. However, there exist equilibria in which the level of capacity in the export sector that is required for importers to infer that the good is of high quality is so large that only countries capable of producing high quality goods would build such capacity. At these equilibria, countries that know themselves to be unable to produce high quality exportables abstain from promoting exports.

Starting at these equilibria, it may well be ill-advised to convince all nations to subsidize their exports. This not only leads countries to produce inappropiate goods but also, by eliminating the information contained in the installed capacity, may lead countries who can produce high quality goods to receive lower prices for their output. Alternatively it makes these countries worse off by forcing them to subsidize their export industry more. They must do this to differentiate themselves from other countries. This argument is developed in Section III. Section IV closes the paper with a caveat to the argument that encouraging countries to promote exports only leads countries that are high quality exporters to be worse off. It presents a model which is technically similar to the one in section II in which high capacity in the export industry is needed to export efficiently. Then only those countries that find the necessary

subsidies to the export sector very distortionary will abstain from export promotion. Transfers to such countries with the condition that they promote exports do not hurt other exporting nations in the absence of terms of trade effects.

II THE MODEL: EQUILIBRIUM EXPORT PROMOTION

I consider one good, say TV sets, which is potentially exportable from country A to country B. This good can be of two qualities, consumers in country B are willing to pay more for the good if it is of high quality. Country B's customers are willing to pay P^h for TV sets if they are known to be of high quality. They are willing to pay only P^l for low quality sets. Thus, I ignore the deleterious terms of trade effects that export promotion can bring about. There are two periods. In the first period quality is not observable by the customers. However, they can make inferences on the good's quality by observing installed capacity. I assume initially that consumers infer the good is of good quality only if the capacity installed in the producing country equals at least K^h; otherwise they infer it is of low quality. For this to be the case, the level K^h must be such that countries capable of producing high quality goods (h-countries) install, in equilibrium, a capacity of at least K^h while others do not. This will later be shown to be true for certain values of K^h. In the second period, having already experienced the good, customers in country B know its quality.

To ensure that collective action is needed to achieve a capacity of K^h, I must assume that it is costly for firms to grow large. The simplest way of modelling this is to assume that capacities above some

level k^m are prohibitively costly while k^m is smaller than K^h. I thus assume that n firms have access to a technology which enables them to build a capacity of k at costs given by:

$$\begin{array}{ll} ck & k \leq k^m \quad , \quad k^m < K^h \quad , \quad nk^m > K^h \\ \infty & k > k^m \end{array} \qquad (1)$$

where the condition that nk^m exceed K^h is necessary to ensure that it is socially possible to produce K^h. Having built a capacity of k, these firms can costlessly produce k units in both periods but cannot produce more than k units in either. I now consider whether any of these n firms would, individually, choose to produce for export. Doing so would yield profits of π^h if the firm is in a high quality country and of π^l if it is in a low quality one:

$$\begin{aligned} \pi^h &= (p^l - c + Rr^h)k \qquad k \leq k^m \\ \pi^l &= (p^l - c + Rp^l)k \qquad k \leq k^m \end{aligned} \qquad (2)$$

where R is a discount factor and r^h is a price between p^l and p^h. Thus, high quality firms do receive somewhat higher prices in the second period as their high quality becomes known. For collective action to be needed π^h (and a fortiori) π^l) must be negative for nonzero k. It is important to point out that for π^h to be negative, which is the case I consider, one of two conditions must hold. Either, the future must be heavily discounted so that future high prices are nor enough to induce firms to invest or customers must be slow in learning from those that have experienced the good that good

quality is being produced so that r^h is low^l. In this case, when a single producer installs some capacity that capacity is insufficient to convince buyers that good quality will be produced. This makes buyers pay little and thus leads to losses for producers.

Consider instead the profits to a firm that has a capacity of k^m while other firms, together, have a capacity of (K^h-k^m). Its profits are W^h if it is located in an h-country and W^l otherwise:

$$W^h = (p^h - c + Rp^h)k^m$$

$$W^l = (p^h - c + Rp^l)k^m \qquad (3)$$

Note that even firms located in countries that produce low quality goods (l-countries) get paid p^h in the first period when installed capacity is large. Unless W^h is positive, production of the good is never socially beneficial. Similarly, unless W^l is positive it is never in the interest of l-countries to produce the good. For W^l to be positive (p^h+Rp^l) must equal or exceed c which again requires that the future be significantly discounted. I start the analysis by studying the incentives to invest in h-countries.

With π^h negative and W^h positive there are two equilibria if all firms must invest simultaneously. The first has no production for export. No firm finds it optimal to invest in capacity because, if it is alone, it will be paid little and make losses. The second has production of Q^h. Then, each firm has an incentive to invest because sufficient capacity is available to ensure high prices. The presence of these two equilibria is akin to the multiplicity of equilibria that arise in the context of adopting superior telephone systems (see

Rohlfs (1974)). There too, adoption of a system by others makes adoption more attractive.

Another possibility, considered in Farrell and Saloner (1985a) is that the adoption decisions are made sequentially but the adoption itself occurs simultaneously. This requires that there first exist n decision periods in which firms decide whether to invest or not. After this round of periods is over, all the firms invest simultaneously. Then the unique equilibrium when W^h is positive is for firms to invest since they can always expect the last firm to decide to invest if all the previous firms have decided to do so.

Yet, a more natural dynamic setup in the context considered here is that firms both decide and invest sequentially. Then, firms that invest early earn π^h at first even when other firms follow. In this case no firm will want to invest early and it is natural to expect the only equilibrium to be the one in which all firms refrain from producing for export.[2] This leads me to assume that in the model presented here the equilibrium with no investment will prevail when it exists.

The government can easily eliminate this equilibrium by encouraging firms to invest in the export sector. In principle, one way of doing so is to promise the first K^h/k^m firms that they will be paid p^h if they export the good. This is essentially the solution proposed by Dybvig and Spatt (1983) for the problem of adoption externalities. Once firms are promised p^h, they will invest in the requisite capacity if W^h is positive. Moreover, once they invest in capacity, the price will automatically equal p^h so the government would, in principle, incurr no cost. This policy has the danger that, unless the government is very precise as to the nature of the good for

which it ensures a price of p^h, firms may produce shoddy and cheap goods to take advantage of the government's program. On the other hand, precise government dictated specifications may lead to inappropiate product designs.

An alternative remedy which would appear to be much more flexible is to subsidize the capacity and/or production of the export industry. Indeed, subsidization of credit to exporting industries and other export subsidies such as tax rebates are widely used policy tools in outward oriented economies such as Korea[3]. The question is still why the government does not, as in Dybvig and Spatt (1983) make the susbsidy contingent on the export drive being unsuccesfull. There are two related reasons for this. The first is that promises by the government that it will subsidize an industry only if its export drive is unsuccesfull are probably not credible. This is particularly true if, as below, there are deadweight costs associated with the taxes needed to finance the subsidy. Then, ex post, it will not be in the governments' interest to pay the susbsidy if the drive is unsuccesfull. The second reason is that it is somewhat hard to specify what it means for an export drive to be unsuccesfull. For instance it would be necessary to consider the possibility that random variations in demand or supply would affect measured export perfomance. By comparison, it is relatively easy to give subsidies contingent on certain export capacity being installed.

For the model considered here, a subsidy of s^h per unit of capacity constructed is necessary to induce any single firm to produce for export where s^h equals:

$$s^h = c - p^l - Rr^h \qquad (4)$$

With this subsidy a single producer breaks even. Since this subsidy induces many firms to enter, industry capacity will exceed K^h so that firms will receive a price of p^h in both periods. Thus the subsidized firms will earn rents equal to N:

$$N = [p^h(1 + R) - c + s^h]k^m = [p^h - p^l + R(p^h - r^h)]k^m \qquad (5)$$

so that profits net of subsidies equal W^h. Note that the subsidy need only be given during the period in which the industry is establishing its credibility. This accords well with the Japanese and Korean practice of giving subsidies to specific industries for a limited time only.[4]

The subsidy given by (4) benefits the industry. However, I assume that nations only offer this subsidy if the benefits to the industry exceed the social costs of the subsidy. The social costs include the total expenditures on subsidies S as well as the cost of the distortions induced by the subsidy d(S). There are two obvious sources of this distortion. The first is that resources must be spent administering the subsidy. In particular the government must verify that capacity for legitimate exportable production is built. Second, distortionary taxes must be raised to finance the subsidy. Thus, larger value for S which requires more taxes and more administration raises d. Under reasonable assumptions the function d is not only increasing but also convex. For instance, suppose the government chooses taxes with the objective of keeping deadweight losses low. Then, the deadweight loss from each successive dollar of taxation is progressively bigger so that d is convex. Similarly, if there are

diseconomies os scale in administering a subsidy program (because, for instance, the incentive for fraud becomes larger as the program is larger) d becomes convex. The total subsidy for an h-country, S^h can either be given by $ns^h k^m$ if it is granted to all the firms or by $s^h K^h$ If it is granted only to enough firms to ensure that local firms receive the price p^h. This second alternative is theoretically more attractive although it may be more difficult to implement in practice. Thus I assume only that the total subsidy S^h is an increasing function of K^h. The profits of each firm net of subsidy equal W^h so that the social benefits of the subsidy, B^h, equal:

$$B^h = nW^h - d(S^h(K^h)) \tag{6}$$

Unless B^h is positive, export promotion is never socially beneficial so that I concentrate on the case in which nW^h exceeds $d(S^h(K^h))$.

I now turn to the incentives faced by the country that produces low quality goods. It too, can ensure production for export by giving a subsidy. However, the subsidy that makes individual producers willing to export equals s^l:

$$s^l = c - p^l(1 + R) = s^h + R(p^h - p^l) \tag{7}$$

which exceeds s^h. The net benefits of susbsidizing exports in the l-country are given by:

$$B^l = nW^l - d(S^l(K^h)). \tag{8}$$

where S^l, the expenditure on subsidies is again assumed to be increasing in the capacity that must be susbsidized K^h. The benefits to the h-country B^h exceed B^l for two reasons. First, W^l is smaller than W^h. Second, if both countries subsidize the same number of units S^l exceeds S^h so that $d(S^l(K^h))$ is bigger than $d(S^h(K^h))$. More importantly, since, s^l exceeds s^h and the function d is convex, each additional unit that is subsidized reduces B^l more than it reduces B^h. This is shown graphically in Figure 1. There, the benefits for both types of countries are shown as functions of K^h under the reasonable assumption that a higher level of K^h requires the subsidy of more units to get the export industry started. If W^l is positive, as in the figure, there is a range for K^h (between zero and K') in which it appears socially beneficial to subsidize the export industry even in the l-country. Even then, for K^h above K', export promotion is, at most, socially optimal in countries that produce high quality goods. This is true for all positive K^h if W^l is negative.

In figure 1 there is always a level of K^h between K' and K" in which promotion is optimal for the country that produces high quality goods but not for the other. This however, requires that K' be below nk^m. Otherwise, the maximum feasible value of K^h makes it worthwhile for the l-country to promote exports.

I now come to the rationale for paying a high price only to goods produced in countries whose capacity exceeds K^h. This rationale rests on the inability of purchasing countries to know much about the quality of goods from newly industrializing nations. Such lack of information is particulaly compelling when one interprets quality broadly to include not only the reliability of the final product but also the promptness with which delivery will take place, the

flexibility of the suppliers to accomodate changes in desired design etc. In the absence of much other information about quality, the level of installed capacity might well become a useful barometer. In particular, in the model presented thus far, as long as K^h is above K' only governments of h-countries find it optimal to promote the export industry. Therefore, if governments are both informed about the quality of the goods that their countries can produce and act in the national interest, a level of K^h above K' separates the l-countries from the h-countries. Governments that know good quality is forthcoming can signal this (as in Spence (1973)) by subsidizing capacity and customers can thus be assured that only h-countries have the requisite capacity.

This leads to two questions. First, is it reasonable to assume that governments are relatively well informed about the quality of the goods producible in their countries? Second, can one expect them to act in the self interest of their country? This second question is an important and extremely difficult empirical question which is left open for future research. In answer to the first question it must be pointed out that governments certainly know more about the level of skills and education of their population than do outsiders. Also, since the government is a large employer it probably knows substantially more about the motivation and aspiration of its country's workers than do foreigners.

Note that, while the model has been constructed under the assumption that governments are certain whether their industries will produce high or low quality, this is inessential. Indeed, the same results would obtain if governments were simply better informed about the probability of being high quality exporters. Some governments

would have to know this probability to be high while others would have to know it to be low. Then, governments who estimate this probability to be high would be willing to subsidize larger capacities.

I now turn to a slightly more formal discussion of the equilibrium values of K^h. First, any value of K^h above K' separates l-countries from h-countries. However, as long as K'' is lower than nk^m, K^h barely exceeding K' is the most natural equilibrium since it involves the smallest deadweight loss from subsidies. Second, values of K^h below K' do not constitute equilibria in this model in the sense that, if K^h is below K', importers are not willing to pay p^h for all units exported by countries with installed capacity equal to at least K^h. This occurs because for K^h below K' governments of l-countries would also subsidize exports if p^h were paid for these exports.

In addition to these values of K^h which promote the separation of countries there are many "pooling" equilibria; indeed these are the only equilibria if K' exceeds nk^m. At these, the capacity of the h-countries and the l-countries is the same so that both get the same price p^m in the first period. This price p^m, which is received only by countries with installed capacity of at least K^m is given by:

$$p^m = ap^h + (1-a)p^l$$

where a is the proportion of countries that actually supply high quality goods. Suppose that the proportion of h-countries in the population is a'. Then, even when the minimum capacity requirement for a country to receive p^m in the first period, K^m, is zero, a will only equal a' if:

$$W'^{l} = (a'p^{h} + (1 - a' + R)p^{l} - c) > 0. \qquad (9)$$

In other words, all l-countries will choose to participate if their proportion is small enough that, even when they all participate, they receive a sufficiently high price. However, if a' is less than or equal to R, the condition that π^{h} be negative contradicts condition (9). Then, l-countries are sufficiently numerous that, if they all participate, they make participation unprofitable. In this case, a will exceed a'. In particular, the proportion of l-countries that export will be such that l-countries are just indifferent between exporting and abstaining from exporting. This implies that a must equal:

$$a = [c-(1+R)p^{l}]/[p^{h}-p^{l}] + d(S^{l}(K^{m}))/[nk^{m}(p^{h}-p^{l})]. \qquad (10)$$

Note that, as K^{m} increases, the proportion of h-countries that export must rise. This raises p^{m} and thus keeps l-countries indifferent between exporting and not exporting. This indifference has important implications. In particular, it means that the separating equilibrium (with K^{h} equal to K') Pareto dominates the pooling equilibria. This is so because importers are also indifferent between the two. Therefore, Pareto superiority requires only that h-countries prefer the separating equilibrium. A sufficient condition for h-countries to do so is[5]:

$$nk^{m}(p^{h}-p^{m}) = nk^{m}(p^{h}-p^{l})(1-a) > d(S^{h}(K')) - d(S^{h}(K^{m})).$$

For a given by (10) the left hand side of this inequality is

equal to:

$$nW^l - d(S^l(K^m)).$$

Thus the inequality can be rewritten as:

$$nW^l - d(S^h(K')) > d(S^h(K^m)) - d(S^l(K^m)) \qquad (11)$$

K ' is defined as the level of capacity which makes nW^l equal $d(S^l(K')$ which, in turn, exceeds $d(S^h(K'))$ so the left hand side of (11) is positive. On the other hand, since l-countries must provide a larger subsidy to obtain the same response by their producers for a given K^m, the right hand side of (11) is nonpositive. Therefore, the separating equilibrium is Pareto superior for sufficiently low a'.

III FORCED EXPORT PROMOTION

Countries with export promotion policies having become so succesfull, it has become commonplace to extoll the virtues of outwards orientation. When these praises are sung by international organizations with the capacity for extensive discretionary funding [6] they presumably come accompanied with subsidies to countries that become outwards oriented[7]. In this section I study the consequences of these policy oriented transfers which will be assumed to be equal to T. For simplicity of exposition I start by analyzing transfers received exclusively by l-countries.

These transfers shift the B^l line up by T. We must distinguish between the cases in which the $B^{l'}$ line meets the x-axis to the left

of both nk^m and K" and the case in which it doesn't. In the first case there is an equilibrium with K^h between the point at which the B^{l_1} line meets the x-axis and K". At this equilibrium only h-countries find it optimal to subsidize a capacity of K^h. Those countries will then continue to receive p^h for their products. Instead, l-countries who receive transfers will receive only p^l as long as they subsidize only as much capacity as is in the national interest. Note, however, that selling goods for p^l may now be in the national interest even when π^l is negative for positive k. This is true as long as the transfer T allows the country to give a subsidy of s^l to certain units at no national cost. In this case the worldwide loss from export promoting policies is twofold. First there is the inefficiency of producing l-country units which equals $-\pi^l$ with k equal to the total units subsidized. This inefficiency is exactly equal to the transfer T. Second there is the deadweight loss from forcing h-countries to subsidize their export industry more in order to distinguish themselves from l-countries.

In the second case there is no level of capacity that distinguishes countries with good quality from others. Then, unless a different signalling mechanism is devised the only equilibria will be pooling equilibria of the form considered above. At these pooling equilibria all exporters are paid p^m in the first period where p^m is strictly smaller than p^h. Thus h-countries are strictly worse off. Moreover, as shown above these pooling equilibria are Pareto dominated by the separating equilibrium if there are a sufficient number of l-countries. Then, even if they receive a transfer T for exporting, l-countries are indifferent between exporting and not exporting. Thus worldwide losses equal the entire transfers to l-countries in addition

to the losses to h-countries.

So far I have considered only transfers to l-countries. The analysis, however, carries over to the more realistic case in which transfers for export promotion are received by both h- and l-countries. Obviously it does not apply when transfers are given only to h-countries; they then have no effect on the separating equilibrium. Suppose then that some h-countries and some l-countries receive transfers of T. This respectively shifts the B^l and B^h lines of the l- and h- countries that receive the transfers. So, again, in the case in which the $B^{l'}$ meets the x-axis to the left of both K" and nk^m the separating equilibrium can be maintained at the cost of raising K^h above K'. Also, if it meets the x-axis to the right of nk^m only pooling is possible. The new possibility that arises is that the $B^{l'}$ meets the x-axis to the right of K" but to the left of nk^m. Then if K^h is chosen below K" there will be pooling. If, instead K^h is chosen above K" only the h-countries receiving the transfer will invest while the others will not. So while raising K^h has the ability of ensuring that only h-countries invest it now has the side effect of shutting out of the export market other h-countries.

IV A CAVEAT: EXTERNAL ECONOMIES

Up to this point the message of this paper has been that subsidies to countries that engage in export promotion may well destroy a relatively good equilibrium and make h-countries considerably worse off without even helping l-countries. In this section I want to emphasize that this is only a possibility. Indeed, a very similar model to the one in section II can be constructed in

which transfers for export promotion are not that destructive. This occurrs if K^h instead of being a variable used to signal is a level of capacity which simplifies the operation of the export sector.

Suppose that, if the export sector is smaller than K^h, it is difficult to export because exports must be arranged on an individual basis while, once the export sector is sufficiently big, trading companies find it easier to arrange exports. Thus, while consumers are willing to pay p^h for all goods, exporting firms receive only p^l if the export sector is small, so that p^h-p^l is spent on transactions costs. On the other hand, once the export sector attains a size K^h, this transactions cost disappears.

Therefore, in all countries, profits to a single exporting firm are given by:

$$\pi^h = (p^l(1+R)-c)k^m$$

which is assumed to be negative while profits to a firm once a capacity of K^h has been established are given by W^h which is assumed to be positive. Then, countries will find it in their best interest to subsidize exports if:

$$B^h = nW^h - d(S(K^h)) > 0$$

where S is the total subsidy needed to obtain a capacity of K^h. Now suppose that countries differ in the distortions caused by the same subsidies. Then, for some countries, those who start from a tax system with few distortions possibly due to the lack of a welfare state, B^h is positive while for others it is negative. In

equilibrium, only the former subsidize exports and therefore export. Now a transfer T from the rest of the world to countries unwilling to export otherwise has a social cost of only T if the transfer makes countries just indifferent between exporting and not exporting.

1The opposite is true in the model of Klein and Leffler (1981) in which information about the good's actual quality spreads very quickly and the future is relatively undiscounted. Then firms capable of producing both the low and the high quality good might prefer to produce the high quality good if the price is high enough that the stream of rents associated with high quality production exceeds the one period benefits of low quality production. It must be pointed out that the Klein and Leffler (1981) method of ensuring high quality production, namely to permit the price to be quite high, does not work here since some firms are only capable of producing low quality and will thus sell low quality goods in the first period even when the price is high.

2The possibility of this "excess inertia" is shown in Farrell and Saloner (1985b).

3See Balassa (1982) p.216 for a discussion of Korean policies.

4See Balassa (1982), p.216 for example.

5This condition is only sufficient because we are neglecting the possible benefits in the second period from the separating equilibrium. These would accrue if, in the pooling equilibrium, information about the good quality of goods is only transmitted imperfectly so that the price in that period is below p^h.

6See for instance IMF (1985) p.12-13 and Clausen (1986) p.10.

7Indeed The Economist 3/22/86 reports that World Bank "policy loans" i.e. loans whose purpose is not to fund specific projects but to facilitate the changing of economic policies, didn't exist in 1979 but accounted for 15-17% of new lending in 1985.

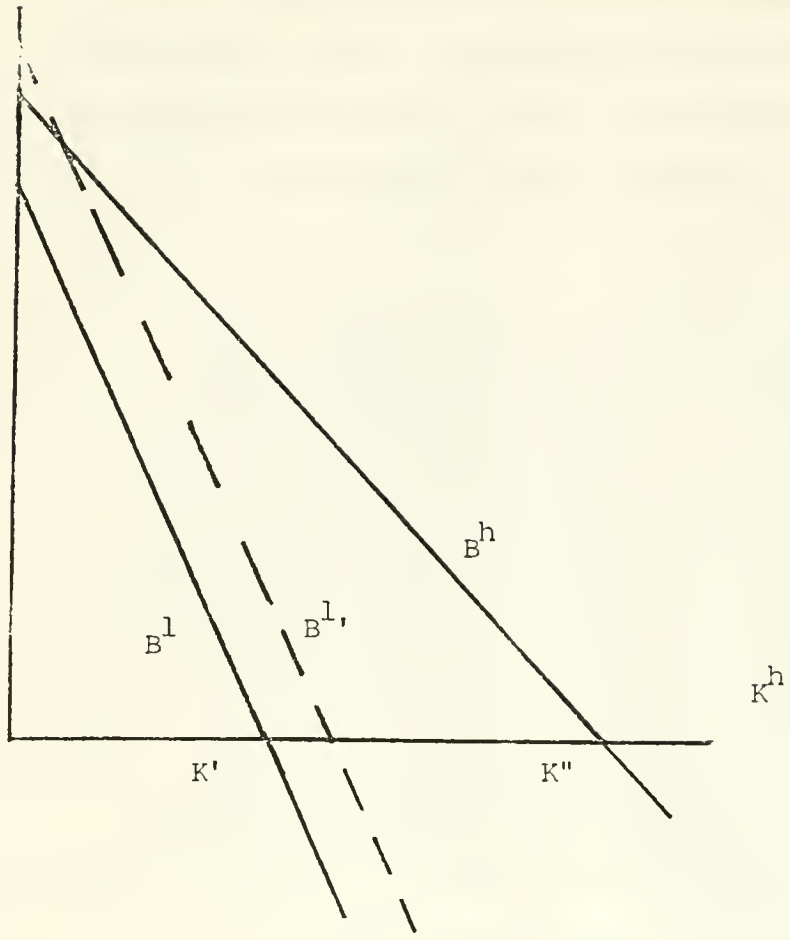

Figure 1

Net social benefit as a function of K^h, the minimum capacity needed to receive P^h in the first period

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