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## Weapon exports and aid to developing countries

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TO DEVELOPING COUNTRIES

Bruno S. Frey

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Diskussionsbeiträge  
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Nr. 31

# WEAPON EXPORTS AND AID TO DEVELOPING COUNTRIES

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## 1. The Traditional View

Weapon exports are considered to be immoral by a vast majority of people concerned with peace because

- (i) armaments have a tendency to lead to war, and
- (ii) especially the poor (underdeveloped) countries should use their very limited capacities to acquire civilian goods in order to increase the standard of living of their population, and not "waste" them for weapons.

It is concluded that the aid to developing countries should either be in the form of civilian goods or in money. This holds particularly for caritative organizations, as e.g. the Red Cross, which would without doubt create a huge scandal if it "aided" these countries by shipping weapons. A similar reasoning stands behind international sanctions, which sometimes only prohibit trade in weapons, but do not apply to other goods such as food and medical equipment going directly to the population (for a general account see Galtung 1967). The problem of weapon exports are widely discussed in politics, the Swiss population e.g. had to vote on that matter as recently as 1972 in a referendum which asked the question whether a neutral country should export arms.

## 2. The Aim of this Study

This study analyzes the effects of various forms of aid on the developing countries' effective "consumption" of

civilian goods and armaments. Can the donor countries influence the way the recipient countries use the aid? If so, what is the most effective form of transfers and are there conflicts with other goals, such as the developing countries' sovereignty? A simple abstract model is used in order to concentrate on the central problem posed. It originates from the modern theory of public finance (see e.g. Pauly 1970, West 1971, Aaron and Fuerstenberg 1971); it thus belongs to what may be called the "economic approach to peace research" (see e.g. Boulding 1962, 1967 and contributions by such noted economists as Isard, Klein and Leontief; for Europe see Rothschild 1970 and Frey 1971).

The results reached are rather surprising and against intuition; they contradict the "traditional" view. It turns out that it is much more difficult than usually thought to give aid without leading to increasing armaments. It does not follow, of course, that the weapon exports to developing countries should be tolerated, the results rather indicate that much more thought should be given to the form in which these countries are supported. Some proposals derived from the abstract model are made which are hoped to give hints about sensible practical policies.

### 3. Aid in Goods and Aid in Money

#### 3.1 Transfers of civilian goods

The goal of donor countries should be to help the poor countries to increase their standard of living but not for them to have more weapons. If two commodities only are considered, namely weapons (W) and other (civilian) goods (G) the rich countries' aim thus is assumed to increase G by a certain amount.

This aim is not intended to be descriptive, of course, but it is normative.

The developing countries (DC), of which one is taken as representative for the whole, are confronted with an effective economic limit given by the foreign exchange constraint. In Fig. 1 AA' indicates the budget line composed of foreign exchange. The developing country considered may from abroad either buy OA' of Good G or OA of W or any combination of them along AA'. The slope of AA' is given by the relative prices in foreign exchange units between weapons and other goods ( $p_w/p_G$ ). The DC values both weapons and other goods. It is not the subject of this paper why these countries (as well as of course the rich countries) want to be armed; for the realism of the model it is sufficient to point out that almost all of them (unfortunately) devote a quite sizable fraction of their foreign exchange income for that purpose. The utility function measuring the value of G and W may either be that of the community as a whole (for the difficulties connected with that concept see Samuelson 1956) or of the ruling elite. The indifference line  $U_0$  shows those combinations (G,W) which leaves the developing country considered at the same utility level. The quantities chosen will be  $(OG_0, OW_0)$  where the highest utility level attainable is reached (Point  $P_0$ ).

Assume that the donor countries transfer civilian goods in the quantity  $G_0 G_1$  to the developing country. The point reached ( $P_1$ ) will not be optimal for the DC: by moving along the new budget line BB' it can reach the optimal point  $P_2$  which is on a higher indifference curve ( $U_2$ ). This movement which entails

a decrease in civilian goods and an increase in weapons can be brought about in two different ways:

- (i) Part of the goods given (namely  $G_1G_2$ ) by the rich countries can be sold on an international market and with the money received weapons of the amount  $W_0W_2$  can be bought. This possibility will be excluded in the following, as the donor countries will certainly oppose such a policy, or there might not be an appropriate market.
- (ii) The developing country will decrease the amount of G-commodities previously bought by  $G_1G_2$ , and with the money saved it will purchase additional weapons of the amount  $W_0W_2$ . This strategy is much more subtle than (i); the donor countries have much less possibility to oppose as such a policy must certainly be considered an "internal affair" of the DC.

In any case, part of the aid given in civilian goods is "wasted" in the sense that the increase of foreign exchange income involved is partly used for the purchase of weapons. The fact that the gift is "tied" has no effect.

Conversely, if aid is given in the form of weapons leading to an initial increase of  $W_0W_1$ , the recipient country will substitute weapons for civilian goods in order to arrive at its optimal situation  $P_2$ .

### 3.2 Transfer in money

Figure 1 moreover shows that an untied foreign exchange transfer in money of A'B' (measured in units of G) or of AB (measured in units of W) leads to exactly the same outcome as before, namely point  $P_2$  with bundle  $(G_2, W_2)$ .

### 3.3 Summary of the Result

Regardless of in what form foreign aid is given the recipient country always substitutes the goods until the optimal point is achieved. Foreign aid in kind or in money has no influence upon what goods are purchased and used by developing countries.

## 4. Aid by Price-Reductions

### 4.1 The effects on the goods purchased

Sometimes aid to developing countries is given by charging lower prices and/or favourable credit conditions connected with the purchase of certain goods. In the simple model presented, the budget line swings about point A to the right (AC'), indicating that the price of civilian goods is decreased compared to weapons prices (see fig. 2). The developing countries will under the new conditions choose  $P_3$  with  $(G_3, W_3)$ . The price reduction was (by assumption) set to be of equal magnitude as the transfer of goods or money in the last section. A transfer of foreign exchange in the form of money would have shifted the budget to BB' going through point  $P_3$ . It can easily be seen that the price reduction on the civilian good leads to an increased consumption of that good compared to transfers of kind or money by the amount  $G_2G_3$ , and to a reduced purchase of weapons by the amount  $W_2W_3$ . The same amount of funds given to the developing country will thus generate a larger increase in civilian goods with price reductions and therefore fulfills better one of the aims followed by the donor countries.

#### 4.2 The effects on the developing country's utility

The favourable effects of price reductions on the structure of goods consumed is, unfortunately, accompanied by a disadvantage: price subsidies are inefficient, i.e. the same increase in utility for the DC can be achieved by a smaller amount of aid if it is given in kind or in money than through price reductions. (Consider fig. 3) The utility level  $U_3$  can be achieved either by a price subsidy leading to budget line AC' and optimal point  $P_3$ , or by a transfer in money or kind leading to budget line DD' and optimal point  $P_4$ . At quantity  $G_3$  one needs MK units of aid if given in money or kind, but  $P_3K$  units if given through price reductions to reach utility level  $U_3$ .

The size of this inefficiency depends on the price and income elasticities of demand and can, in principle, be measured empirically. If e.g. the income elasticity is unity, the price elasticity - 0.75 (implying an elasticity of substitution of the utility function of unity) and the price reduction is 50%, 24.3% less aid would be needed if the gift were made in money or kind, or conversely, available foreign exchange income of the developing country would increase by 18.9% if given in the form of goods or money (see Aaron and Fuerstenberg 1971, Table 1).

#### 4.3 The donor's and recipient's utility: the basic goal conflict

It should be noted that this inefficiency occurs with respect to the recipient country, only. It may well be that the donor countries prefer price reductions because it leads to a decrease in the



"consumption" of weapons and an increase in civilian goods. The utility gain of the rich countries cannot, however, be usefully compared to the utility loss of the developing countries.

This points to a basic conflict of goals as there is in any case some "waste" involved: If aid is given to maximally increase the poor country's utility a part of the civilian goods and money transferred will be "wasted" for the purchase of weapons. If aid is given such as to maximize the purchase and consumption of civilian goods, part of the aid is "wasted" in the sense that the DC's utility could have been increased more by a different form of transfer.

## 5. Possible Solutions

### 5.1 Transfer of goods with restricted substitutability

The aid given to a DC can be composed of goods which

- (i) were consumed before in a limited extent only or not at all; and/or
- (ii) such large quantities must be transferred that only a small part of that aid can be substituted.

Consider figure 4 whose abscissa represents the quantities of a particular civilian good  $G^i$ . DC reaches its optimal point  $P_0$  with the commodity bundle  $(G_0^i, W_0)$ . Assume that the quantity  $G_0^i G_1^i$  is transferred such that  $P_1$  is reached. The developing country would like to attain  $P_2$ , the utility maximum on budget line  $FF'$ . This is, however, not possible as the purchase of  $G^i$  by DC can only be reduced to zero, but not below. (Remember also that - by assumption - the G-commodities cannot be sold on an international market.) All the developing country can do is to reduce their purchases.

of the civilian good from  $G_0^i$  to 0 and use the receipt to buy additional arms to the amount  $W_0A$ . The "waste" is reduced by  $G_2^i, G_2^{i'}$ . The "waste" reduction is the larger the less of the civilian good was initially consumed and the more of it is transferred.

In practice, it is difficult to apply this policy as there are usually substitutes to the  $G^i$ -commodity concerned whose purchase can be reduced if the foreign exchange outlays for  $G^i$  have fallen to zero. Even if this problem did not exist and a good is transferred which is not purchased at all, it is doubtful whether this good adds much to the welfare of the poor country.

## 5.2 "All or None Scheme"

Another possibility to aid the DC with as little possibility for it to substitute for weapons is to confront the recipient country with an "all-or-nothing" offer such as point  $P_5$  in fig. 4. At that point more of good  $G^i$  is consumed than otherwise yet the recipient country accepts this offer because it leads to a (small) increase of utility (from  $U_0$  to  $U_0'$ ). The donor country makes clear that it stops aid immediately if the DC substitutes along its budget line  $FF'$ . This implies, of course, a certain interference with the internal affairs, making the conflict of goals again apparent.

## 6. Final Remarks

The analysis developed and the particular model used may be criticized on various grounds, e.g. for its too high level of abstraction. It should, however, be kept in mind that it is the purpose of this paper to highlight

only one, but important, aspect of armaments of poor countries and the aid by the rich nations. There are many other aspects of their interrelationship which were not touched upon here.

Two possible and worthwhile points of criticism may be mentioned here:

- (i) The utility function (indifference) curves of the DC between weapons and civilian goods was taken to be given, i.e. the development aid does not induce any relevant shifts. Though this seems a priori realistic within a given political system because behind these preferences there are rather basic interests of a country, it would be worthwhile to test this assumption empirically.
- (ii) The analysis assumes that movements along a budget line are costless. This is, of course, not true in reality, but seems to be a useful approximation: No change of internal production is needed but only a different use of foreign exchange earnings which is much easier to do, especially with well developed international markets.

The analysis leads to rather surprising results:

"Aid" in the form of weapons lends to the same structure of consumption of developing countries as aid in the form of civilian goods or in money (foreign exchange).

If the donor countries want the poor countries to use their aid for non-military purposes, basic goal conflicts arise: if aid is given in the form of price subsidies, the recipient countries experience a relative loss of utility, if other measures are used (such as an "all-or-none" scheme) there is an interference in the developing countries' internal affairs.

It follows that much more thought must be given to the problem than done up to now.

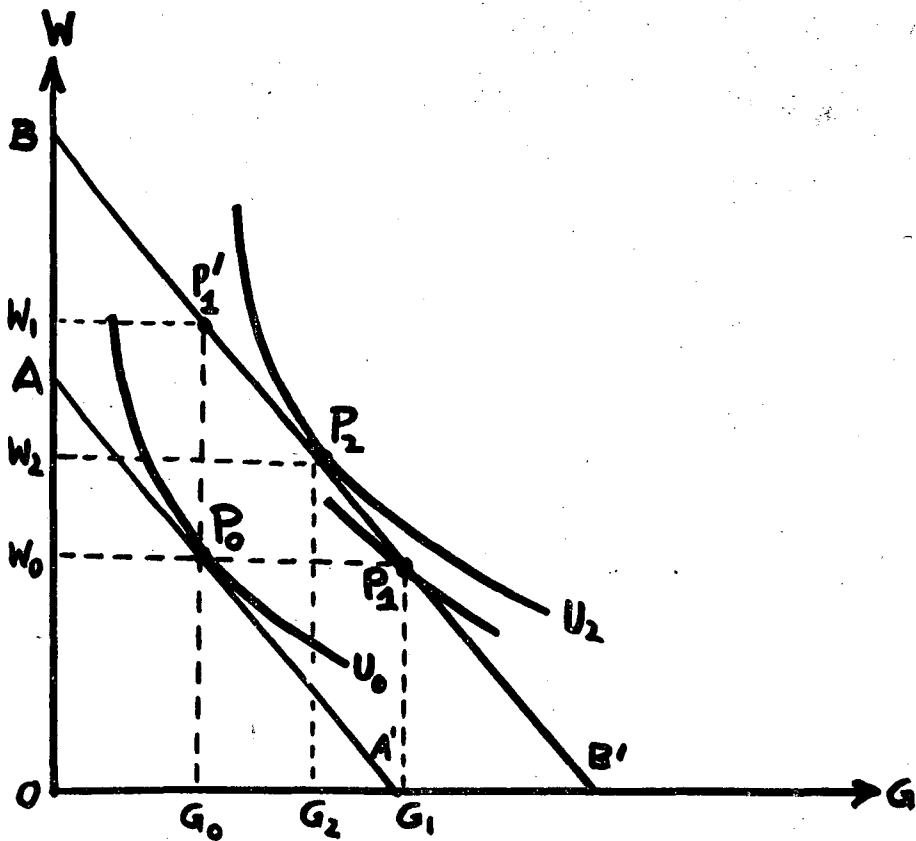


fig. 1

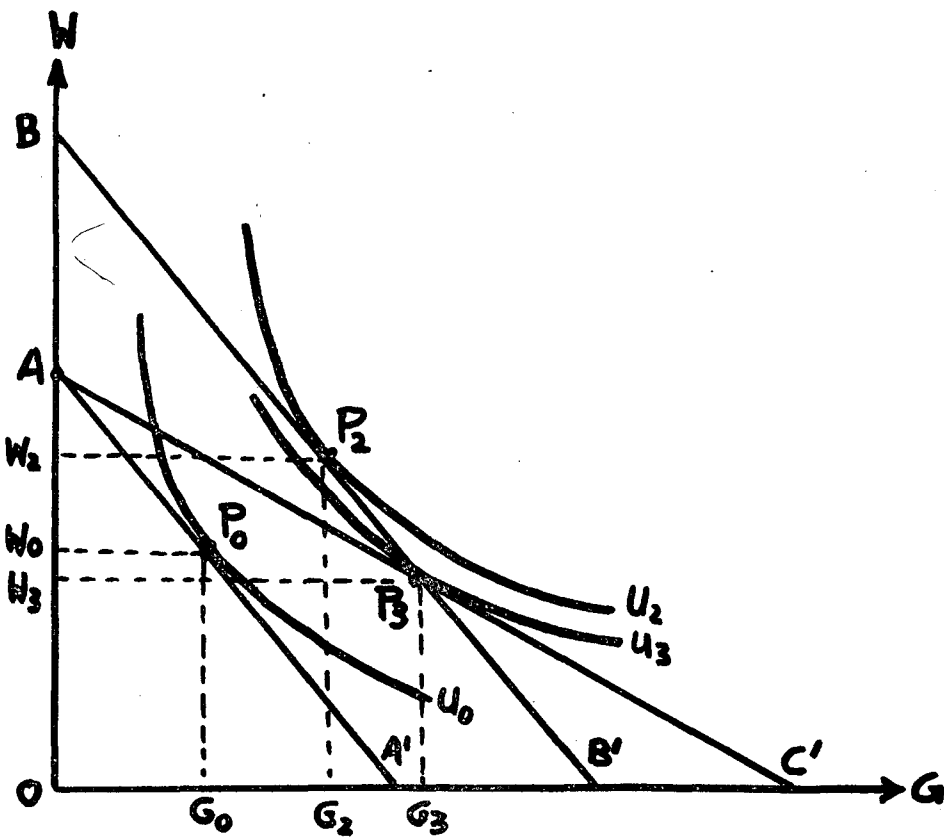


fig. 2

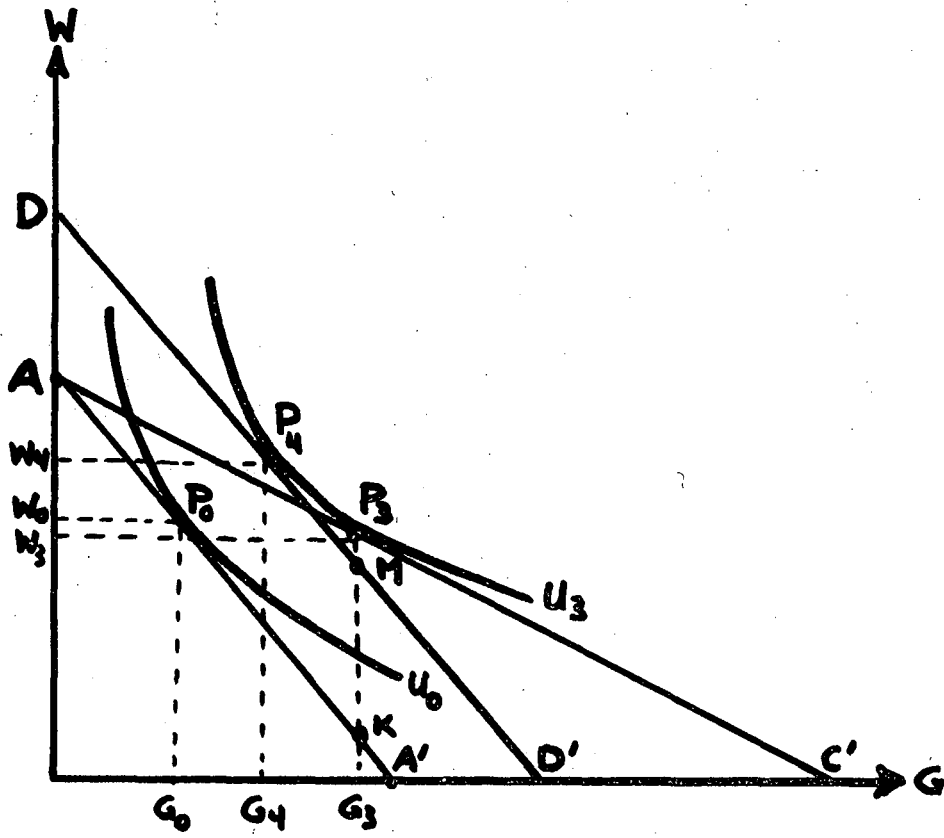


fig. 3

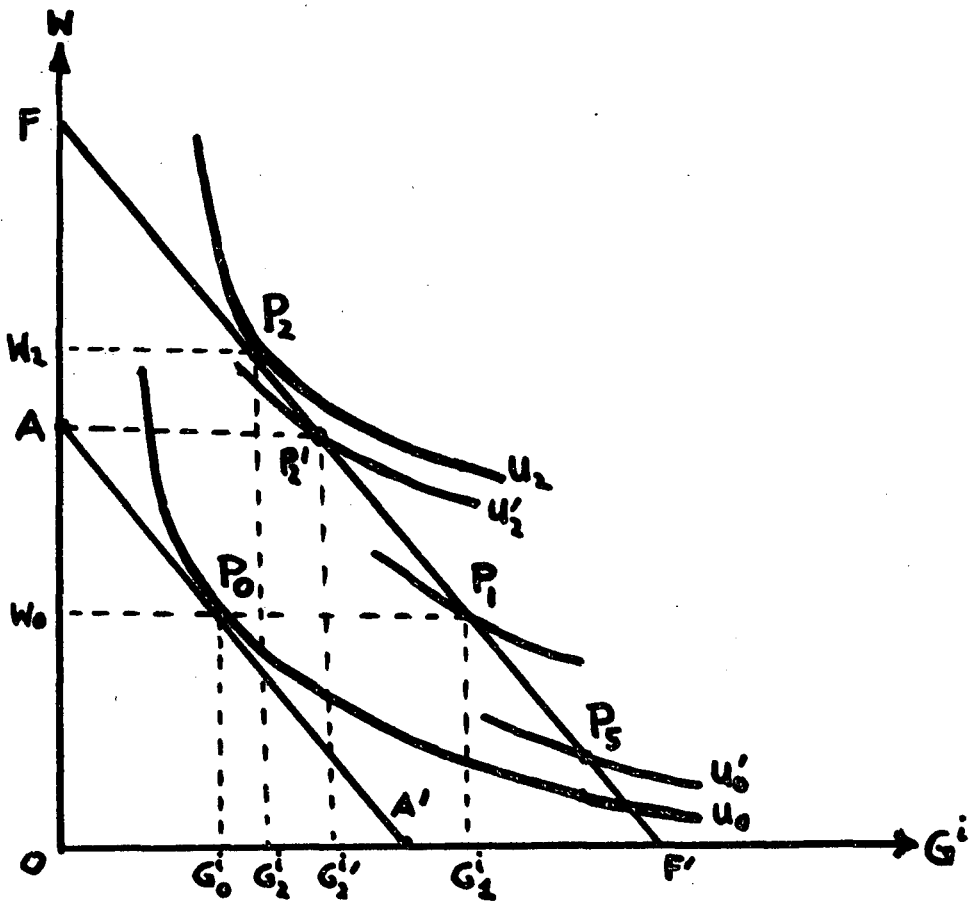


fig. 4

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## Summary

The goal of the rich countries should be to aid the poor countries to increase their standard of living but not to increase their holding of weapons. It is shown that a basic conflict of goals arises. The structure of "consumption" of the recipient countries cannot be influenced by giving the aid in the form of (civilian) goods in contrast to the transfer of untied foreign exchange. In any case there results a substitution towards the bundle of commodities desired by the developing countries. Compared to that situation, the consumption of civilian goods can be induced to increase by granting a price-subsidy which, however, leads to a smaller increase in utility than with a transfer in money or kind. Transfers of goods with restricted substitutability and "all-or-none" schemes are suggested to overcome the conflicts mentioned but they are most difficult to put into practice. To be effective, they imply an interference with the internal affairs of the poor countries which is per se undesirable. The paper suggests that much more thought should be given to this important problem which is only rarely explicitly considered but which is most difficult to solve.