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TITLE: COSTS AND BENEFITS OF SOVIET TRADE WITH EASTERN EUROPE: A THEORETICAL AND QUANTITATIVE ANALYSIS

PART I
"UNCONVENTIONAL GAINS FROM TRADE"

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"UNCONVENTIONAL GAINS FROM TRADE"

by

Michael Marrese and Jan Vaňous

Abstract

In the Introduction to the paper the authors explain their motivation for the study of unconventional gains from trade. They make three stylized observations about the pattern of trade within the Council for Mutual Economic Assistance (CMEA) for the period 1960 - 1980:

(i) the Soviet Union has been "subsidizing" certain Eastern European countries by exporting "hard goods" (fuels, non-food raw materials, food and raw materials for food) at prices below world market prices in exchange for imports of "soft goods" (machinery, equipment and industrial consumer goods) at prices above world market prices, especially if account is taken of the relatively lower quality of Eastern European manufactures in comparison with their Western counterparts;

(ii) within CMEA, trade between any two Eastern European countries exhibits balanced trade in "hard goods" and balanced trade in "soft goods";

(iii) Soviet national security is produced from a combination of Soviet troops and military hardware within the Soviet Union, Soviet troops and military hardware stationed in Eastern Europe, and the allegiance of Eastern European countries.

The first observation indicates that two different sets of terms of trade exist simultaneously for the Soviet Union — prevailing terms of trade on the world market as well as what appear to be inferior terms of trade with Eastern European countries. The second observation indicates that Soviet trade behavior within CMEA is unique and therefore some special aspect of the Soviet Union's relationship to Eastern Europe may hold the key to understanding the presence of two sets of terms of trade. The third observation implies that the allegiance of Eastern European countries can serve as a substitute for the use of Soviet labor and capital in providing security services. Because the Soviet Union is the dominant power within CMEA, the authors contend that it utilizes this tradeoff.

The authors introduce the concept of unconventional gains from trade, by which they mean non-market benefits of bilateral agreements which are secured through preferential trade treatment. These non-market benefits of bilateral agreements may be categorized into four classes: military, political, economic, and ideological. The most important types of military benefits are:

(i) creation and maintenance of military alliances;
(ii) absence of threat (pacification impact);
(iii) availability of military bases in strategic locations;
(iv) access to military technology, know-how, and training;
(v) proxy intervention (availability of modern-day international mercenaries);
(vi) possibility of importing military services in the case of an internal conflict;
and (vii) ability to consume another country's defense services (free-rider aspect of defense as a public good).

Potential political benefits include voting along alliance lines in international forums (United Nations, other international organizations), informal foreign government and media support, and the support and friendship of a foreign population. Unconventional economic benefits include increased economic stability, reduced risk of disrupted flow of strategic commodities, and reduced risk of refusal to purchase a country's exports for reasons other than
their price-competitiveness. Possible ideological byproducts of bilateral agreements primarily occur in three areas: acceptance of a desired political ideology and its propagation to other countries, achievement of religious unity, and strengthening of ethnic solidarity.

In Section II the authors discuss compensating transfer payments by a large country, which unilaterally has the power to decide on the extent of military and political association with another country, to a smaller country, which potentially is a source of external military and political benefits which can be produced at no extra cost in terms of real resources. The authors argue that in the case of divergence of preferences between the government of a large country (e.g., the USSR) and the population of a small country (e.g., any country in Eastern Europe), there may be a need to compensate the population of the small country for the loss of sovereignty. However, the population of the small country will not generally be better off in association with the large country because it is not necessary to compensate it fully for the loss of sovereignty (in view of the human and economic cost of a rebellion against the dominant foreign power).

Different ways of generating non-market benefits are discussed in Section III. These include export and import subsidies, quota allocation, preferential tariff treatment, and export permits. Since the generation of non-market benefits by means of preferential trade treatment may cause various distortions in the economy trying to generate them (the standard optimality condition: marginal rate of transformation = marginal rate of substitution = uniform international terms of trade may have to be violated), a question arises why these non-market benefits are not generated by payment in the form of direct grants. The reason for this is that in many situations direct grants are inappropriate or even impossible to use.

One such situation would occur if the population of the large country does not approve of its government subsidizing the per capita consumption of material goods in another country. This situation would be even more serious if the level of the per capita consumption in the donor country is already below that of the recipient country. To prevent social unrest in the large country, hidden trade subsidies may be viewed by the government of the donor country as a safer means, when compared to direct grants, of securing political allegiance and/or military benefits from the small country.

The reason why the authors deal with non-market benefits is that market exchange for these benefits would sometimes be considered (ethically) unacceptable. Public auctions of "country votes" in international forums are nonexistent, non-aggression pacts do not appear on the open market, and populations do not readily exchange religious or ideological beliefs for material handouts.

The second reason to secure the above-mentioned non-market benefits through a covert payment system, such as preferential trade treatment, is that preferences of governments differ frequently from the preferences of populations. Since a government makes decisions, yet it does not wish to alienate its population, a government may wish to conceal both the nature and the payment procedure of certain bilateral agreements. For the issues under discussion here, the most important differences in preferences between governments and populations are likely to be caused by differences in the extent to which self-esteem, pride, cultural heritage, ethnic background and other non-economic values enter into the respective utility calculations.

The third reason to employ a less explicit way to generate non-market benefits is that government officials are not held accountable for actions about which the population does not know. This consideration may be particu-
larly relevant here because it is difficult to assign a monetary value to the non-market benefits under discussion.

A final point against the use of direct grants is related to the public good aspects of defense. A country's military force may not have to be increased in size in order to offer protection or deterrence to a neighboring country. Nonetheless, the neighboring country may wish to donate a cost share for those services in order to strengthen the other country's willingness to maintain such a defense structure. However, in a democratic country it probably would be very difficult to persuade legislators to support a system of direct grants to a militarily powerful ally for what appears to be a public good, especially since the benefits of the public good are conditional upon a spectrum of possible future events. Legislators or other decision-makers may believe that voters are unable to appreciate fully the range of possible future states of the world, and thus unable to understand the insurance-like benefits of the externality.

In Section V the authors present a diagrammatical exposition of optimal trade policy for the large country given the presence of unconventional gains from trade. The key result is that even in the presence of unconventional gains from trade, the optimal trade behavior of the large country requires the equality between the marginal rate of substitution, the marginal rate of transformation, relative prices (terms of trade) inclusive of non-market benefits with a particular small partner country, and relative prices (terms of trade) with the rest of the world. This result is important because it allows for the presence of bilateral terms of trade which differ from world market terms of trade and because the large country will typically trade both with a small country offering non-market benefits at what appear to be inferior terms of trade, and with the rest of the world at what appear to be superior world market terms of trade. In addition, in Appendices I, II, and III, various extensions of the simple diagrammatical model presented in Section V are discussed.

In summary, the authors conclude that the presence of unconventional gains from trade arises because of conflicts among the preferences of different groups in society, which motivate government officials to choose bilateral preferential trade treatment as a hidden way to generate the non-market benefits associated with bilateral agreements. One manifestation of bilateral preferential trade treatment is the existence of two sets of terms of trade. Given the two sets of terms of trade, an economy's equilibrium position will be defined relative to the terms of trade on which the marginal trade transaction was based and relative to the change in endowment due to the implicit transfer of resources.
UNCONVENTIONAL GAINS FROM TRADE*

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"UNCONVENTIONAL GAINS FROM TRADE"

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I. Introduction

Consider the following three stylized observations for the period 1960-1980:

(i) within the Council for Mutual Economic Assistance (CMEA), the Soviet Union has been "subsidizing" certain Eastern European countries by exporting "hard goods" (fuels, non-food raw materials, food and raw materials for food) at prices below world market prices in exchange for imports of "soft goods" (machinery, equipment and industrial consumer goods) at prices above world market prices, especially if account is taken of the relatively lower quality of Eastern European manufactures in comparison with their Western counterparts;

(ii) within CMEA, trade between any two Eastern European countries exhibits balanced trade in "hard goods" and balanced trade in "soft goods";

(iii) Soviet national security is produced from a combination of Soviet troops and military hardware within the Soviet Union,
Soviet troops and military hardware stationed in Eastern Europe, and the allegiance of Eastern European countries.

The first observation indicates that two different sets of terms of trade exist simultaneously for the Soviet Union -- prevailing (two-way) terms of trade on the world market as well as what appear to be inferior one-way terms of trade with Eastern European countries.² However, international trade theory argues that the profit opportunities inherent in arbitrage effectively exclude the possibility that two different sets of terms of trade exist simultaneously. Thus the first observation suggests that the assumptions underlying international trade theory do not hold completely for the Soviet Union.

The second observation indicates that Soviet trade behavior within CMEA is not typical of other bilateral trade behavior within CMEA. Instead, bilateral barter between Eastern European countries may be expected to produce trade flows which do not show any clear pattern of subsidization.³ Therefore, some aspect of the Soviet Union's relationship to Eastern Europe, other than socialist or ethnic solidarity, may hold the key to understanding the presence of the two sets of terms of trade.

The third observation implies that the allegiance of Eastern European countries can serve as a substitute for the use of Soviet labor and capital in providing security services. Because the Soviet Union is the dominant power within CMEA, it is our contention that the Soviet Union utilizes this tradeoff. In other words, the Soviet Union
engages in preferential trade treatment in order to sustain the allegiance of Eastern European countries.

These observations motivated us to study the relationship between bilateral preferential trade treatment and the non-market benefits associated with bilateral agreements. We refer to non-market benefits of bilateral agreements which are secured through preferential trade treatment as unconventional gains from trade. If unconventional gains from trade exist, then the presence of two terms of trade is not surprising since a country may be willing to engage in bilateral preferential trade treatment as a means of obtaining the byproducts of bilateral trade.

Non-market benefits of bilateral agreements may be categorized into four classes: military, political, economic, and ideological. The most important types of military benefits are: (i) creation and maintenance of military alliances; (ii) absence of threat (pacification impact); (iii) availability of military bases in strategic locations; (iv) access to military technology, know-how, and training; (v) proxy intervention (availability of modern-day international mercenaries); (vi) possibility of importing military services in the case of an internal conflict; and (vii) ability to consume another country's defense services (free-rider aspect of defense as a public good). Potential political benefits include voting along alliance lines in international forums (United Nations, other international organizations), informal foreign government and media support, and the support and friendship of a foreign population. While most economic benefits of bilateral trade agreements are conventional in nature, several may be considered unconventional:
increased economic stability, reduced risk of disrupted flow of strategic commodities, and reduced risk of refusal to purchase a country's exports for reasons other than their price-competitiveness. Possible ideological byproducts of bilateral agreements primarily occur in three areas: acceptance of a desired political ideology and its propagation to other countries; achievement of religious unity; and strengthening of ethnic solidarity.

This paper focuses on the setting for and importance of unconventional gains from trade, then outlines an optimal trade policy for a situation in which unconventional gains from trade are prominent. Since the unconventional gains to which we refer are mainly of a military and political nature, several questions are likely to arise. Why would any country engage in preferential trade treatment when the outcome of a conventional military alliance is more military security and lower defense costs for all participants? Why should allegiance be sustained by a transfer payment via a trade-related subsidy rather than a direct grant? Do trade-related subsidies occur in large enough magnitudes to warrant our attention? In the next several sections we attempt to answer these questions. We also present a simplified diagrammatical exposition of a country's optimal behavior when faced with two different sets of terms of trade, one of which is related to the presence of unconventional gains from trade.
II. Compensating Transfer Payments

Suppose two nations form an alliance and each contributes a positive level of military forces. Suppose further that the joint military force is larger than either of the pre-alliance forces. Then both nations benefit from the alliance through more military security and lower defense costs. It appears that no compensating transfer payment is required because both nations are better off than they would be in the absence of the alliance. One assumption underlying this result is that the extra security can leave both nations better off. We will examine this assumption more carefully.

It is reasonable to assume that the formation of an alliance improves the position of both nations if the interests of the governmental decisionmakers in each country are the interests of the population and neither nation dominates the other. Otherwise, particular groups in each country may be seriously disadvantaged.

Consider two economies, POLECON and EXECON. Let POLECON represent a politicized economy which unilaterally has the power to decide on the extent of military and political association between the two countries. Let EXECON represent an economy which potentially is an external source of military and political benefits for POLECON, benefits which can be produced at no extra cost in terms of real resources. Assume that the governments of POLECON and EXECON share mutual interests.

By assumption, POLECON's government has the power to choose the extent of military and political association with EXECON. Moreover,
suppose POLECON realizes that EXECON's population interprets greater association as meaning less sovereignty. In fact, the dissatisfaction of EXECON's population with such an association could lead to some form of domestic instability. Neither EXECON's government nor POLECON's government wants to face domestic instability in EXECON which could cause a change in leadership or social system. So POLECON's government, out of self-interest, may decide to partially compensate EXECON for the loss of sovereignty by transferring resources which are to be used to increase EXECON's per capita consumption of material goods and services. EXECON's population does not need to be aware of either the existence or the source of the subsidy, but it must translate the higher per capita consumption into more satisfaction with EXECON's government, which increases the probability of domestic stability.

POLECON, once having made the decision on the extent of association, could be viewed as facing the following choice:

A: Association with EXECON, no transfer of resources to EXECON, \( P_A \) probability of social stability in EXECON;

B: Association with EXECON, transfer of resources to EXECON, \( P_B \) probability of social stability in EXECON;

where \( P_B > P_A \) because EXECON's population is being partially compensated for the loss of sovereignty. Suppose POLECON chooses alternative B.

EXECON's population in deciding whether to maintain domestic stability confronts a situation already influenced by the decision of
POLECON's government to associate with EXECON and to transfer real resources to EXECON as partial compensation for this association. EXECON's population has to decide whether to attempt to end the association with POLECON, which may be expressed as the following choice:

A: Rebellion which would imply $Q_A$ probability of no association with POLECON, $H_A$ level of physical health, $C_A$ level of per capita consumption with $Q_A$ probability and $C_B$ level of per capita consumption with $(1 - Q_A)$ probability;

B: No rebellion which would imply certain association with POLECON, $H_B$ level of health, and $C_B$ level of per capita consumption;

where $Q_A$ is the probability that the rebellion is successful, $H_A < H_B$ due to the death and injury costs of rebellion, and $C_A < C_B$ because a successful rebellion would mean the end of the compensating transfer from POLECON and a short-term decline in per capita consumption.

Alternative A not only implies a lower level of per capita consumption but also a lower level of physical health. So EXECON's population may choose alternative B, even though the partial compensation received from POLECON may not offset fully the decrease in utility due to EXECON's loss of sovereignty. Thus the presence of a compensating transfer payment may be interpreted as a revealed preference proof that POLECON is receiving benefits from association with EXECON (assuming the absence of altruism), yet it does not imply that EXECON's population is better off than it would be without association.
Thus we have argued that a divergence of preferences between POLECON's government and EXECON's population may create a situation in which POLECON partially compensates EXECON for the loss of sovereignty. Revealed preference indicates when POLECON is better off with the increased probability of social stability in EXECON. When EXECON's population decides not to rebel, then we know by revealed preference that EXECON's population views the decrease both in physical health \((H_B - H_A)\) and in per capita consumption \((C_B - C_A)\) as too high a price to pay for \(Q_A\) probability of disassociation with POLECON. Moreover, EXECON's population would not be better off in association with POLECON as long as POLECON does not fully compensate EXECON for the loss of sovereignty. POLECON has an incentive not to fully compensate EXECON's population because the death and injury cost of rebellion, under any compensation scheme, acts as a deterrent to rebellion in EXECON. POLECON's goal is not to provide full compensation to EXECON for the loss of sovereignty, but is the absence of rebellion.
III. Different Ways of Generating Non-Market Benefits

Various types of non-market benefits discussed above can be generated by preferential trade treatment, of which the most important types are export subsidies, import subsidies, quota allocation, preferential tariff treatment, and export permits. In addition, some of these non-market benefits can be obtained by direct payment in the form of either a per unit subsidy or a lump-sum grant, or can be obtained in exchange for various forms of foreign aid. We will refer to these direct means of securing non-market benefits as direct grants.

Since the generation of non-market benefits by means of preferential trade treatment may cause various distortions in the economy trying to generate them (the standard optimality condition MRT = MRS = uniform international terms of trade may have to be violated), a question arises why these non-market benefits are not generated by payment in the form of direct grants. While in some cases this may be possible, in addition to being the most efficient way of generating them, there are other situations in which direct grants are inappropriate or even impossible to use. Let us consider several of these other situations. To do this, let us revert to the example of POLECON and EXECON.

One such situation would occur if POLECON's population does not approve of its government using taxes to increase EXECON's per capita consumption of material goods. This situation would be more serious if POLECON's own per capita consumption is lower than that of EXECON. To prevent social instability in POLECON, hidden trade subsidies may be
viewed by POLECON's government as a safer means, when compared to direct grants, of securing political allegiance and/or military benefits from EXECON.

We are dealing with non-market benefits because market exchange for these benefits would sometimes be considered (ethically) unacceptable. Public auctions of "country votes" in international forums are nonexistent, non-aggression pacts do not appear on the open market (what would one be worth?), and populations do not readily exchange religious or ideological beliefs for material handouts. Yet we have just argued in the previous section that governments sometimes form associations to secure such non-market benefits. Therefore, the second reason to secure the above-mentioned non-market benefits through a covert payment system, such as preferential trade treatment, is that the preferences of governments differ frequently from the preferences of populations. Since a government makes decisions, yet it does not wish to alienate its population, a government may wish to conceal both the nature and the payment procedure of certain bilateral agreements. For the issues under discussion here, the most important differences in preferences between governments and populations are likely to be caused by differences in the extent to which self-esteem, pride, cultural heritage, ethnic background and other non-economic values enter into the respective utility calculations.

The third reason to employ a less explicit way to generate non-market benefits is that government officials are not held accountable for actions about which the populations does not know. This consideration may be particularly relevant here because it is difficult to assign a monetary value to the non-market benefits under discussion.
A final point against the use of direct grants is related to the public good aspects of defense. A country's military command may not have to increase its size to offer protection or deterrence to a neighboring country. Nonetheless, the neighboring country may wish to donate a cost share for those services in order to strengthen the other country's willingness to maintain such a defense structure. However, in a democratic country it probably would be very difficult to persuade legislators to support a system of direct grants to a militarily powerful ally for what appears to be a public good, especially since the benefits of the public good are conditional upon a spectrum of possible future events. Legislators or other decisionmakers may believe that voters are unable to appreciate fully the range of possible future states of the world, and thus also unable to understand the insurance-like benefits of the externality.

Before discussing the ways by which POLECON may generate unconventional gains from trade, some qualifications concerning the scope of our analysis are necessary. For simplicity, we model, in Section V, one type of behavior POLECON may exhibit, namely the maximization of conventional gains from trade subject to a constraint which is influenced by unconventional gains from trade. Moreover, we assume the existence of two sets of terms of trade, but do not explain how these terms of trade are generated. The more favorable terms from POLECON's point of view may be considered to be the world market terms of trade. The less favorable terms of trade may be agreed upon in a bilateral bargaining process, but we exclude this topic here despite its importance.
overall process of generating unconventional gains from trade is often a two-stage procedure. The first stage refers to the determination of the size of per unit export and import subsidies. The second stage, which we examine, refers to the trade pattern POLECON would choose given the already determined export and import subsidies.

To generate unconventional gains from trade, POLECON could sell her exports to another country or trade region at a price below the prevailing price for an identical commodity traded on the world market. In an economy that is centrally planned or at least in which the government exercises direct control over foreign trade, it would be relatively easy to create a system of two-tier export prices. The lower tier prices would be charged to "friendly" countries and the upper tier prices, which are equal to prevailing world market prices, would be charged to the rest of the world. Exports may still be sold to friendly countries at a profit, i.e., above the domestic cost of production, but below the maximum profit that could be earned otherwise. Alternatively, exports could possibly be even further subsidized if they are sold below the domestic cost of production. Typically the amount of exports sold at the lower price is limited, at most, to an amount which is utilized domestically by the recipient country in order to prevent re-export to the rest of the world, thus eliminating the opportunity for the recipient country to earn windfall profits via arbitrage.

Variations on this scheme include the practice of sending exports to friendly countries at world market prices for payment in non-convertible (and therefore probably overvalued) currencies, and the practice of straight barter of commodities while the prevailing international
terms of trade are supposedly observed. In both cases, however, the import options of the exporting country are constrained and the "value" of export earnings for POLECON is likely to be below their nominal value.

In economies in which the government does not enjoy a foreign-trade monopoly, it is not possible to order a private exporter to lower the price to a friendly country. However, governments in market economies can grant preferential credit terms to a friendly importing country through a government export credit agency. It can be readily shown that if the government of the exporting country grants the friendly importing country a loan at an interest rate \( r_e \) below the prevailing market interest rate \( r_m \) with lump-sum repayment at the end of \( T \) years, the discounted "grant element" of this loan equals \( 1 - \frac{1 + r_m}{1 + r_e} T \) times the loan. Then the "effective export price" is less than the nominal export price and this has more or less the same effect as the explicit two-tier pricing system mentioned above.

Similarly, governments of countries that exercise direct control over foreign trade can import commodities from friendly countries at prices above the prevailing world market prices. Again, these commodities may still be imported at prices below the domestic cost of production but at higher than the minimum necessary cost, or possibly imported at prices even above domestic cost. The quantity of these imports will again be limited by the importing country in order to prevent excessive profits on the part of the exporting country. This means of generating externalities in friendly countries generally cannot be used by governments of
market economies unless they agree to subsidize private importers and so motivate them to import from a higher cost but friendly country, or opt to enter the import business directly. In any case, the effect of import and export subsidies is symmetrical in the sense that they both worsen the terms of trade of the country providing the subsidy.

Other ways of generating unconventional gains from trade include quota allocation, preferential tariff treatment, and export permits. If import quotas for a given commodity are dispensed by the government of an importing country by methods other than auction, e.g., through administrative or legislative decision, friendly countries which export this commodity can be given larger quotas. This amounts to a form of foreign aid since otherwise these exporters would be willing to bid for the privilege of securing a quota share. In the case of tariffs, the granting of the most-favored-nation (MFN) status to a friendly country may provide access to an export market from which she previously had been excluded entirely (with prohibitive tariffs) or in which she was at a considerable commercial disadvantage by having to compete with countries holding the MFN status. The benefits of preferential tariff treatment in this case require little further comment. Finally, especially in the case of strategically sensitive commodities (those with potential military use or those embodying superior technologies), export permits may be granted to friendly countries but not to others.
IV. Two Situations Consistent with the Hypothesis of Unconventional Gains from Trade

At this point, the reader may question whether trade-related subsidies occur in large enough magnitudes to warrant our attention. Therefore, we present two examples -- one of an import subsidy and one of an export subsidy.

In the case of Soviet-Cuban trade, Soviet imports of sugar from Cuba are highly subsidized. The amount of the Soviet sugar subsidy for the period 1970-1979 is calculated in Table 1 below.\textsuperscript{14} The subsidy is computed by calculating the difference between the unit value of Soviet sugar imports from Cuba and the world market price of sugar (both measured in dollars), and then multiplying the difference in the two prices by the quantity of sugar imports. The results of calculation in Table 1 are consistent with the hypothesis that until 1975 the Soviet imports of Cuban sugar were set so as to insulate the Cuban economy from the impact of wide fluctuations in world market prices of sugar, a continuation of their role in the 1960's. Since 1976, these prices have been set so as to reward the Castro regime for the Cuban mercenary services and proxy intervention on behalf of the Soviet Union in countries such as Angola, Ethiopia, Mozambique, and Southern Yemen.\textsuperscript{15} In addition, the sugar import subsidy may be a reward to the Cuban political leaders for their willingness to promote Soviet ideology and anti-American feelings in the Third World, and provide the Soviet Union with a strategically located military base. When the nickel import subsidy, the oil export subsidy, and various forms of foreign aid are taken into account, Soviet economic assistance to Cuba in 1978 was estimated at 2.9 billion
<table>
<thead>
<tr>
<th>Year</th>
<th>Imports of Sugar from Cuba (in million rubles)</th>
<th>Quantity of Imports (in million metric tons)</th>
<th>Unit Value of Imports (in dollars per metric ton)</th>
<th>World Market Price (in dollars per metric ton)</th>
<th>Subsidy (in million dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>364.3</td>
<td>3.000</td>
<td>134.90</td>
<td>81.10</td>
<td>161.4</td>
</tr>
<tr>
<td>1971</td>
<td>185.6</td>
<td>1.500</td>
<td>137.50</td>
<td>99.20</td>
<td>57.4</td>
</tr>
<tr>
<td>1972</td>
<td>131.5</td>
<td>1.100</td>
<td>144.20</td>
<td>160.30</td>
<td>-17.7</td>
</tr>
<tr>
<td>1973</td>
<td>323.1</td>
<td>1.600</td>
<td>274.20</td>
<td>208.30</td>
<td>105.4</td>
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<tr>
<td>1974</td>
<td>610.8</td>
<td>1.856</td>
<td>434.90</td>
<td>653.90</td>
<td>-406.5</td>
</tr>
<tr>
<td>1975</td>
<td>1344.3</td>
<td>2.964</td>
<td>628.70</td>
<td>449.10</td>
<td>532.3</td>
</tr>
<tr>
<td>1976</td>
<td>1397.8</td>
<td>3.068</td>
<td>604.30</td>
<td>254.90</td>
<td>1072.0</td>
</tr>
<tr>
<td>1977</td>
<td>1675.3</td>
<td>3.652</td>
<td>622.20</td>
<td>179.00</td>
<td>1618.6</td>
</tr>
<tr>
<td>1978</td>
<td>2117.2</td>
<td>3.797</td>
<td>815.60</td>
<td>172.60</td>
<td>2441.5</td>
</tr>
<tr>
<td>1979*</td>
<td>1990.0</td>
<td>3.650</td>
<td>840.00</td>
<td>213.30</td>
<td>2287.5</td>
</tr>
</tbody>
</table>

*estimated

Source: Authors' own calculation based on the data from the USSR Foreign Trade Yearbooks, and IBRD and IMF data on world market prices of sugar.
dollars, i.e., about 24 percent of Cuban GNP or 300 dollars per capita. 16

Another situation suggestive of generation of unconventional gains from trade is the Soviet oil export subsidy to Eastern Europe for the period 1970-1980. Table 2 contains two time series of estimates for this subsidy, one based on the official exchange rate and one based on a derived (more realistic) exchange rate. Calculations I and II were made according to the following:

Calculation I: \[ S_{it}^R = \left( P_{pt}^R - (P_{wt} E_t) \right) Q_{it} \]

Calculation II: \[ S_{it}^\$ = \left( (P_{pt} D_t) - P_{wt}^\$ \right) Q_{it} \]

where

\( S_{it}^R \) = implicit Soviet oil export subsidy to country i in year t evaluated at the official exchange rate and at current prices in millions of rubles,

\( S_{it}^\$ \) = implicit Soviet oil export subsidy to country i in year t evaluated at a derived exchange rate and at current prices in millions of dollars,

\( P_{pt}^R \) = Soviet export price of one ton oil to country i measured in rubles,

\( P_{wt}^\$ \) = Soviet export price of one ton of oil to the Developed West measured in dollars,

\( E_t \) = official Soviet ruble-dollar exchange rate in year t (rubles per one dollar),

\( D_t \) = derived dollar-ruble exchange rate in year t (dollars per one ruble)
Table 2.- Implicit Subsidy in Soviet Exports of Crude Oil and Oil Products (CTN 21+22) to Eastern Europe

<table>
<thead>
<tr>
<th>Year</th>
<th>Bulgaria</th>
<th>Czechoslovakia</th>
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Calculation II

(millions of current dollars at derived ruble/dollar exchange rate)

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*estimated

Source: Vaňous (1980a), Table 13, p.30 (estimates for years 1979 and 1980 were revised).
\[ Q_{it} = \text{number of tons of oil and oil products exported} \]
\[ \text{to country } i \text{ in year } t. \]

Calculation II is included in Table 2 as a way of quantifying an additional aspect of the implicit export subsidy, namely that the Soviet Union accepts payment in non-convertible rubles rather than in convertible dollars. Acceptance of non-convertible rubles adds to the implicit subsidy because the non-convertible ruble is over-valued. The correction for the extent of overvaluation is based on the effective Hungarian ruble/dollar cross-exchange rate used in the 1970's which we believe to be a more realistic estimate of the market value of the ruble.\(^{17}\)

According to Calculation II, the cumulative Soviet implicit subsidy on export of oil and oil products to Eastern Europe during the period 1970-1980 is approximately 45.6 billion dollars, of which 30.1 billion dollars is attributable to differences in prices (at official exchange rates) and 15.5 billion dollars to additional discounts due to payment in non-convertible rubles. The country distribution of implicit subsidies is as follows: 8.0 billion dollars to Bulgaria (17.6 percent), 11.8 billion dollars each to Czechoslovakia and East Germany (25.8 percent each), 5.0 billion dollars to Hungary (11.0 percent), 9.0 billion dollars to Poland (19.8 percent), and none to Romania.

If the Soviet Union approaches the issue of unconventional gains from trade in an efficient manner, then the pattern of trade subsidization in Eastern Europe should reflect each Eastern European country's relative strategic importance and political allegiance to the Soviet Union.
Another explanatory variable is the extent to which each Eastern European country regards Soviet military and political goals as distinct from their own. Last but not least, this pattern is affected by different domestic fuel endowments among the Eastern European countries. 18

The opportunity cost of the oil export subsidy to the Soviet Union has skyrocketed in 1979-1980 as a result of dramatic increases in the world market price of crude oil. In 1980, the estimated oil export subsidy to Eastern Europe (according to Calculation II) will equal 1.1-1.3 percent of Soviet GNP, or about 50 percent of total Soviet imports from the Developed West. For Eastern Europe, it will represent 3.0-3.5 percent of her GNP, or about 50 percent of her total export earnings in the dollar area. Moreover, because the Soviet Union is a net importer of relatively overpriced CMEA machinery and industrial consumer goods and a net exporter of relatively underpriced non-food raw materials and other fuels, estimates of total Soviet trade subsidies for 1970-1980 would be well above the figures reported in Table 2.
V. A Diagrammatical Exposition of Trade Policy Given the Presence of Unconventional Gains from Trade

Consider a model consisting of three countries (trade regions), POLECON, EXECON, and the Rest of the World (ROW). POLECON is an economy which realizes that she can generate unconventional gains from trade with EXECON but not with ROW. EXECON exchanges non-market military and political benefits with POLECON in return for preferential terms of trade (relative to those offered by ROW). POLECON and EXECON produce and consume two traded goods, goods A and B, and one non-traded good -- defense services, good C.

Before we begin to analyze the unconventional gains from trade, let us consider a situation when only conventional gains from trade are available to POLECON, both from EXECON and ROW. For simplicity, assume temporarily that POLECON is a small country facing two sets of constant terms of trade. In particular, POLECON faces superior terms of trade $TT_1$ with ROW and inferior one-way terms of trade $TT_{II}$ with EXECON. POLECON's terms of trade with EXECON are one-way terms of trade in the sense that EXECON always prefers to import good B in exchange for her exports of good A at the terms of trade $TT_{II}$, but never prefers to import good A in exchange for exports of good B at the terms of trade $TT_{II}$. This assumption is necessary in order to prevent POLECON from making infinite profit by first selling all of her production of good B to ROW at the terms of trade $TT_1$, then selling all her imports of good A to EXECON at the terms of trade $TT_{II}$ and so on, with ever increasing gains from trade.
In the absence of unconventional gains from trade, POLECON will trade only with ROW. POLECON's conventional gains from trade and welfare are maximized by observing the rule \( \text{MRS}_{A,B} = \frac{MRT_{A,B}}{P_B/P_A} \approx \frac{TT_{I}}{TT_{II}} = \max(TT_{I}, TT_{II}) \).

Let us now assume that POLECON can generate non-market military or political benefits from EXECON by trading with EXECON at the one-way preferential terms of trade \( TT_{II} < TT_{I} \). Initially, to simplify the analysis, we will consider the presence of conventional and unconventional gains in a model of pure exchange and ignore the problem that the preferential terms of trade \( TT_{II} \) cannot be constant over the entire range of possible trade.\(^9\)

Let POLECON's initial endowment of goods be represented by point \( E_0 \) in Figure 1. Assume that POLECON's endowment of goods A and B actually available for consumption or exchange with EXECON and ROW is only \( E_1 \) because POLECON has decided to use some of goods A and B to produce a target amount of good C -- defense services -- in order to insure that POLECON's endowment \( E_1 \) is secure with a given probability. The slope of the line connecting points \( E_0 \) and \( E_1 \) indicates the proportions in which goods A and B are used to produce good C domestically. For simplicity, we are assuming a Leontief-type fixed-coefficient production function for defense. Alternatively, some defense services may be acquired in the form of external military benefits available to POLECON from EXECON in exchange for preferential terms of trade relative to those offered by ROW. Let us also assume that the maximum amount of external military benefits POLECON can generate by trading with EXECON will save an amount
Figure 1. - Detailed Construction of the Consumption Possibility Frontier in a Model of Pure Exchange
of goods A and B so as to move POLECON from endowment point $E_1$ to point $E_2$. In other words, POLECON will still have to produce some defense services domestically since the presence of the external military benefits cannot completely provide the target amount of defense services. Finally, we assume that the marginal value of the non-market benefits POLECON can generate in EXECON is sufficiently large for POLECON to decide to conduct at least a portion of her trade with EXECON.

Next, we will show that, given the above assumptions, POLECON's consumption possibility frontier from trade with both countries is her consumption possibility frontier from trade inclusive of external benefits with EXECON, $\text{CPF}_{I,II}$, between points $E_1$ and $J$, and from point $J$ onward it is a straight line with slope $TT_I$. POLECON's consumption possibility frontier from trade with both countries is labeled $\text{CPF}_{I,II}$. $\text{CPF}_{I,II}$ consists of two segments because at point $E_1$, the slope of $\text{CPF}_{I,II}$ (hereafter referred to as $\text{MBTT}_{II}^i$, the marginal barter terms of trade with EXECON inclusive of external benefits) is greater than $TT_I$. So POLECON chooses to begin trading with EXECON and continues to direct all further trade to EXECON until the $\text{MBTT}_{II}^i$ is equal to $TT_I$. Notice that we are assuming diminishing marginal productivity of the trade subsidy in producing non-market benefits in EXECON. This appears in Figure 1 as a strictly concave segment of $\text{CPF}_{I,II}$ between, say, points $E_1$ and $G$. So as POLECON increases her trade with EXECON at the terms of trade $TT_{II}$, $\text{MBTT}_{II}^i$ will decrease.

The locus of points on the strictly concave segment of $\text{CPF}_{I,II}$ between points $E_1$ and $J$ represents POLECON's consumption bundles when her optimal trade pattern implies trade only with EXECON. Suppose POLECON
trades $F'E_1$ of good $B$ for $F'G'$ of good $A$. Then POLECON's corresponding consumption bundle is not point $G'$, but point $G$. This is due to the non-market benefits which POLECON receives from EXECON, the opportunity cost of which is a reduction in domestic defense expenditures of $G'K$ of good $B$ and $KG$ of good $A$. Notice that $G'G$ and $E_1E_2$ represent the same change in goods $A$ and $B$, which is interpreted as a change in endowment. More generally, segment $E_1E_2$, which represents POLECON's variable endowment, is constructed by plotting the non-market benefits POLECON receives for all levels of trade with EXECON.

POLECON is not at an optimum at point $G$ because $MBTT^I_{II} < TT^I_{II}$. To reach an optimum, POLECON would have to reduce her trade with EXECON and increase her trade with ROW from zero until $MBTT^I_{II} = TT^I_{II}$ (at point $J$).

There are two alternative ways to explain how POLECON reaches point $J$. We could say that POLECON moves from $E_1$ to $E_3$ because she has decided to trade with EXECON up until $MBTT^I_{II} = TT^I_{II}$. Such a level of trade with EXECON implies a level of external military benefits that allows POLECON to decrease domestic production of $C$ and thus save an amount of $A$ and $B$, which explains the move from $E_1$ to $E_3$. From $E_3$, it is clear that POLECON trades $HE_3$ of good $B$ to obtain $HJ$ of good $A$, and thereby reaches point $J$.

Alternatively, we could say that POLECON starts trading from the endowment point $E_1$ and exports $H'E_1$ of good $B$ in exchange for $H'J'$ of good $A$. However, at point $J'$ POLECON has more security than the target level and reduces her domestic production of defense services, thereby moving to point $J$ on $CPF^I_{II}$. Since $E_3HJ$ and $E_1H'J'$ are
identical triangles, either way we obtain the same result. Since the benefits of further trade with EXECON are less than the costs at point J ($MBTT_{II}^{i} < TT_{I}$ after point J), POLECON will trade with ROW from point J onward.

Figure 2 below shows the conventional and unconventional gains from trade in a model with production when POLECON trades both with EXECON and ROW. If POLECON can reach the highest indifference curve $U_2$ by trading both with EXECON and ROW, then she should distribute her trade in such fashion so as to achieve the optimality condition $MRS_{A,B} = TT_{I} = MBTT_{II}^{i}$ (at point J) = $MRT_{A,B}$. It does not matter whether POLECON first starts trading with EXECON or ROW, either way welfare is maximized. The optimal pattern of trade for POLECON is to trade with EXECON from the endowment point $P_2$ along the terms-of-trade line $TT_{II}$ up to point J, and to trade with ROW from point J to point $C_2$ along the terms-of-trade line $TT_{I}$. Out of total exports of $P_2L$ of good B, $P_2H$ will be sold to EXECON in exchange for imports of $HJ$ (=$LK$) of good A, and $HL$ (=$JK$) will be sold to ROW in exchange for imports of $KC_2$ of good A. Conventional gains from trade are represented by a movement from indifference curve $U_0$ tangent to the PPF (not shown) to indifference curve $U_1$. Unconventional gains from trade due to external defense benefits generated by POLECON in EXECON are represented by a movement from point $C_1$ on indifference curve $U_1$ to point $C_2$ on indifference curve $U_2$.

Another result obtained from Figure 2 is that except in the case when POLECON trades only with EXECON, the presence of unconventional
Figure 2. - Conventional and Unconventional Gains from Trade in a Model with Production when POLECON Trades both with EXECON and ROW
gains from trade will not lead to a new set of marginal conditions since
the usual optimality rule \( \text{MRS}_{A,B} = T_{I} = \text{MRT}_{A,B} \) will still be
observed.\(^{21}\) It is definitely not true that POLECON should choose to
produce at a point on her PPF where \( \text{MRT}_{A,B} \) equals some weighted average
of either the observed or the "inclusive of external benefits" terms of
trade with EXECON and ROW.

Up to now, all the analysis presented above was based on POLECON's
view of the world. To conclude this section of the paper, let us look
at EXECON's trade from her point of view; this is done in Figure 3 below.\(^{22}\)
EXECON's PPF is drawn to suggest that she has comparative advantage in
production of good A, while POLECON has comparative advantage in production
of good B. EXECON is assumed to be a small country both relative to
POLECON and ROW. In the absence of POLECON as a possible trade partner,
EXECON would trade with ROW, produce at a point \( P_{1} \) on her PPF and consume
at point \( C_{1} \) on indifference curve \( U_{1} \). The optimality condition EXECON
would follow is \( \text{MRT}_{A,B} = \text{MRS}_{A,B} = T_{I} \). If POLECON were EXECON's only
possible trade partner, EXECON facing the terms of trade \( T_{II} \) with POLECON
would desire to produce at point \( P_{2} \) and consume at point \( C_{2} \) on indifference
curve \( U_{2} \), following the rule \( \text{MRT}_{A,B} = \text{MRS}_{A,B} = T_{II} \).

Let us now assume that POLECON is initially EXECON's only trade
partner and suddenly there is a possibility for EXECON to trade with ROW
at terms of trade \( T_{I} \), different from her terms of trade \( T_{II} \) with POLECON.
Clearly, what EXECON's decisionmakers would desire to do is to produce
at point \( P_{2} \) and initially sell all EXECON's production of good A to
POLECON at the terms of trade \( T_{II} \), thereby reaching point \( V \) on the good
Figure 3. — EXECON's Conventional Gains from Trade with POLECON and ROW
B axis. From point V, EXECON would trade with ROW along the terms-of-trade line $TT_1$ up to point $C_4$, reaching the level of welfare represented by indifference curve $U_4$. In fact, EXECON would be even better off by selling all her stock of good B to ROW in exchange for good A, and then starting to trade with POLECON again; this process could go on indefinitely and the gains from trade to EXECON would steadily increase with each round of arbitrage.

It is obvious that the above possibility would never occur in the real world because POLECON is willing to subsidize EXECON only up to a point where POLECON's marginal benefit (inclusive of non-market benefits from trade with EXECON) equals POLECON's marginal opportunity cost of this trade, which is given by POLECON's terms of trade with ROW, $TT_1$. Thus POLECON will fix the size of her trade triangle with EXECON and EXECON has no choice but to accept what POLECON offers. Contrary to the usual result of $2 \times 2 \times 2$ trade models in which it is the small country that determines the size of the trade triangle, in this case it is the large country that does so.

Let us now assume that POLECON's optimum trade triangle with EXECON is triangle $P_2HJ$ (or $P'_1H'J'$) from Figure 2 above. By sliding this trade triangle along EXECON's PPF with point J (or J') being the origin, we obtain EXECON's consumption possibility frontier after trade with POLECON, CPFP. In Figure 3, the trade triangle SRP$_1$ is the same as trade triangles $P_2HJ$ and $P'_1H'J'$ in Figure 2. A portion of EXECON's CPFP will lie within her PPF and is thus irrelevant from the viewpoint of EXECON's decisionmakers. Given EXECON's CPFP, EXECON will maximize
her conventional gains from trade with ROW by observing the optimality condition \( MRS_{A,B} = \text{slope of } \text{CPF}_P = TT_1 \). Thus EXECON should trade with ROW from point S on CPF_P and export ST of good B in exchange for imports of TC_3 of good A. The position of point S in turn determines the position of production point P_1. Not surprisingly, the slope of EXECON's PPF at point P_1 equals the slope of EXECON's terms of trade with ROW, TT_1. Thus the optimality condition for EXECON's trade in its entirety is \( MRS_{A,B} = \text{slope of } \text{CPF}_P = MRT_{A,B} = TT_1 \).

EXECON's conventional gains from trade are represented by a movement from an autarky production/consumption point C_0 on indifference curve U_0 (not shown in Figure 3) to point C_1 on indifference curve U_1. EXECON's unconventional gains from trade in the form of a trade subsidy granted by POLECON to EXECON are represented by a movement from point C_1 on indifference curve U_1 to point C_3 on indifference curve U_3. The situation depicted in Figure 3 actually shows EXECON re-exporting some of her imports of good B from POLECON to ROW instead of exporting good A as would happen in the absence of POLECON's preferential treatment of EXECON. Naturally, this need not be the case since EXECON may export good A both to POLECON and ROW if her indifference map has a bias in favor of consuming good B (rapidly diminishing marginal utility from consumption of good A). However, in either case, EXECON will be able to realize positive unconventional gains from trade and reach a level of welfare that could not be attained by trading with ROW alone.
VI. Extensions, the Direction of Future Research and Conclusions

Three extensions of the present model are presented in Appendices. Appendix I contains the special case of POLECON trading only with EXECON. In Appendix II, we analyze the impact of an improvement in POLECON's terms of trade with ROW. Predictably, the distribution of POLECON's trade will change in favor of ROW. In Appendix III, we relax the assumption that POLECON is a small country and find that the optimality condition becomes $\text{MRT}_{A,B} = \text{MBTT}_I = \text{MBTT}_I^I = \text{MRS}_{A,B}$. 

In order to use a two-dimensional diagrammatical model, the present paper examines the utility associated with the consumption of goods A and B, subject to obtaining a fixed target amount of good C. Future research, utilizing general equilibrium mathematical models, should develop the production and consumption implications for decisionmakers who seek to maximize the utility derived both from conventional and unconventional gains from trade (in this paper we were able to analyze only the former case).23

In summary, the presence of unconventional gains from trade arises because of conflicts among the preferences of different groups in society, which motivate government officials to choose bilateral preferential trade treatment as a hidden way to generate the non-market benefits associated with bilateral agreements. One manifestation of bilateral preferential trade treatment is the existence of two sets of terms of trade. Given the two sets of terms of trade, an economy's equilibrium position will be defined relative to the terms of trade on which the marginal trade transaction was based and relative to the change in endowment due to the implicit transfer of resources.
APPENDIX I

Special Case when POLECON Trades with EXECON Only

If POLECON can reach the highest indifference curve $U_2$ by trading with EXECON only, as is shown in Figure 4 below, the optimality condition now becomes $\text{MRS}_{A,B} = \text{MBTT}_{II}^i$ (at point $J^*$) = $\text{MRT}_{A,B}$. This could happen if the POLECON preference map has a strong anti-trade bias, i.e., POLECON citizens or leaders have strong preference for consumption of good $B$ over good $A$ and the marginal utility of good $A$ is rapidly diminishing. It is also more likely to happen if the externality generated by POLECON in EXECON is "large" and the marginal productivity of the implicit trade subsidy granted to EXECON by POLECON exhibits only slowly diminishing returns. Either of these two factors or both together may cause the highest indifference curve to be tangent to the $\text{CPF}_{II}^i$ or $\text{CPF}_{I,II}$ locus between points $P_1$ and $J$ in Figure 3. It is also important to note that the terms of trade with ROW are no longer relevant for POLECON's decisionmaking. Point $P_1$ is no longer the optimal production point; the optimal production point $P_1^i$ must lie on POLECON's PPF to the right of point $P_1$ and satisfy the above-stated optimality condition.
Figure 4.- Unconventional Gains from Trade in a Model with Production when POLECON Trades Only with EXECON
APPENDIX II

An Impact of An Improvement in POLECON's Terms of Trade with ROW

What happens if initially POLECON trades both with EXECON and ROW and her terms of trade with ROW suddenly improve rotating from $TT_1^0$ to $TT_1^1$ as illustrated in Figure 5 below? The improvement in the terms of trade will clearly lead to a reallocation of production from point $P_1$ to point $P'_1$, i.e., a decline in output of good A and an increase in output of good B. Consumption will move from point $C_2$ to point $C_3$ on a higher indifference curve $U_3$. The amount of good B exported may either increase or decline. Imports of good A will definitely increase if good A is a normal good. The distribution of POLECON's trade will change substantially. In particular, POLECON's trade with EXECON will decline relatively and absolutely, while her trade with ROW will increase relatively and possibly absolutely.

In Figure 5, the amount of trade POLECON conducts with EXECON after her terms of trade with ROW improved, declines absolutely. In reality, the absolute decline in POLECON's trade with EXECON may not be that large because of two factors. Firstly, if we make a reasonable assumption that the external benefits generated by POLECON in EXECON are inversely proportional to the ratio $TT_II^1/TT_II^0 < 1$, which is now less than the original ratio $TT_II^0/TT_II^0$, then the strictly concave portion of the $CPF_{II}^1$ locus between points $F_1$ and $G$ (see Figure 1) will rotate upward. In other words, the vertical distance between the $CPF_{II}^1$ locus
Figure 5. - Impact of an Improvement in POLECON's Terms of Trade with ROW on POLECON's Regional Structure of Trade
and one-way terms of trade with EXECON TTII through point E₁ in Figure 1 will become greater since EXECON can be expected to become more grateful or allegiant for the relative increase in the implicit trade subsidy. This is one factor which will partially offset the initial incentive facing POLECON to divert her trade to ROW in response to an improvement in her terms of trade. Secondly, it may not be unreasonable to assume that there is a fixed relationship between the terms of trade offered to EXECON by POLECON and the terms of trade offered by ROW, i.e.,

\[
\frac{TT_{II}}{TT_I} = \beta, \ 0 < \beta < 1.24
\]

This, too, would prevent a drastic decline in EXECON's relative share of POLECON's trade.
APPENDIX III

Impact of an Assumption that POLECON is a Large Country

How are the previous results affected once we add more realism to the analysis and recognize that POLECON would typically be a large country? Thus POLECON's terms of trade with EXECON and ROW can no longer be represented by straight lines and we have to use non-linear offer curve analysis to determine the optimum amount and regional distribution of POLECON's trade. In order to demonstrate that our analysis does not depend on whether POLECON starts trading with EXECON first, in Figure 6 below, we reverse the sequence and assume that ROW becomes POLECON's first trading partner. The ROW offer curve is labeled OC₁. Let us now slide the origin of offer curve OC₁ along POLECON's PPF and trace out the maximum quantity of each commodity available to POLECON for given quantities consumed (by POLECON) of the other commodity. By connecting all points so derived, we obtain POLECON's consumption possibility frontier after trade with ROW. This envelope of all achievable consumption points is the well-known Baldwin frontier and is labeled BF₁. Next, consider the EXECON offer curves OC₁ and OC₁I, both starting from point P, it is immediately apparent that for any given amount of exports of good B by POLECON, EXECON offers a smaller amount of imports of good A than ROW. However, that is not a reason for POLECON not to trade with EXECON, unless EXECON's offer curve OC₁I (which is still "one-sided" in the sense that EXECON insists on importing good B and exporting good A) has a slope less than POLECON's MRTₐₐB everywhere. Since this is not the case in Figure 6, we can proceed with the second stage of the analysis.
Figure 6. Conventional and Unconventional Gains from Trade with EXECON and ROW when POLECON is a Large Country.
By sliding EXECON's offer curve OC_{II} along POLECON's consumption possibility frontier after trade with ROW, BF_{I}, we can construct POLECON's consumption possibility frontier after trade with both countries which is labeled BF_{I,II}. It is readily apparent that even without taking into account the possible non-market benefits generated by POLECON in EXECON, POLECON's welfare is increased by trading with both countries, since the envelope BF_{I,II} lies strictly outside envelope BF_{I} except at one point. In the absence of non-market benefits, the optimality condition for conducting POLECON's trade would be MRT_{A,B} = MBTT_{I} = MBTT_{II} = MRS_{A,B}, where MBTT_{I} and MBTT_{II} are POLECON's marginal barter terms of trade with ROW and EXECON, respectively, or the slopes of envelopes BF_{I} and BF_{I,II}. Thus POLECON should produce at point P on her PPF and begin trade by exporting PR of good B to ROW in exchange for imports of RS of good A, thereby reaching point S on envelope BF_{I}. From point S onward, POLECON should trade with EXECON and export SV' of good B in exchange for imports of V'C_{1} of good A. POLECON's conventional gains from trade are represented by a movement from an autarky point on her PPF on indifference curve U_{0} (not shown) to point C_{1} on indifference curve U_{1}.

Since POLECON's observed average terms of trade with EXECON, measured by the slope of the line SC_{1}, are (always) inferior to her terms of trade with ROW, measured by the slope of the line PS, trade with EXECON should generate non-market benefits for POLECON in EXECON. We can now assume that POLECON exports SV' of good B in exchange for imports of V'C_{1} of good A, but she actually consumes at point C_{2} because her decisionmakers realized that at point C_{1} her consumption was more secure.
than required, reduced her domestic production of defense, thereby saving enough of goods A and B to reach consumption point C₂. Alternatively, we can argue that at point S, POLECON's decisionmakers realized that they could generate military benefits in EXECON, reduced domestic production of defense services, thereby moving from point S to point T. In order to generate the non-market benefits in EXECON, POLECON would then sell TV (=SV') of good B to EXECON in exchange for imports of VC₂ (=V'C₁) of good A. Either way, the end result is the same; POLECON realizes unconventional gains from trade represented by the movement from point C₁ on indifference curve U₁ to point C₂ on indifference curve U₂.

An important point is that POLECON would have conducted some trade with EXECON irrespective of whether any non-market benefits can be generated or not. Thus in this case, the external military benefits generated by POLECON in EXECON were not entirely required by POLECON. Why then would EXECON be willing to generate these benefits (which may or may not be without cost to EXECON)? One plausible story is that EXECON's leaders think that POLECON's average terms of trade with ROW (represented by line PS) are also POLECON's marginal barter terms of trade, i.e., EXECON's leaders suffer from an illusion that POLECON is a small country in world trade and faces a perfectly elastic offer curve on the part of ROW. Thus EXECON's leaders tend to think that they are receiving preferential trade treatment and supply external military benefits to POLECON in exchange for something they might be able to obtain anyway. Alternatively and possibly even more likely, POLECON's leaders point out to EXECON's leaders the difference in POLECON's average
terms of trade with EXECON and ROW and demand some external military
benefits from EXECON in return for the imaginary trade subsidy. POLECON's
leaders do not bother to point out that should POLECON attempt to increase
exports of good B to ROW, her marginal barter terms of trade with ROW
would be less than those with EXECON, thereby making trade with EXECON
more attractive than additional trade with ROW.\textsuperscript{27}

In the presence of unconventional gains from trade with EXECON,
the optimality condition for conducting POLECON's trade becomes
\[ \text{MRT}_{A,B} = \text{MBTT}_I = \text{MBTT}_{II} = \text{MRS}_{A,B}, \]
where \( \text{MBTT}_{II} \) are POLECON's marginal
barter terms of trade with EXECON inclusive of external benefits, or the
slope of the concave locus between points J and C\textsubscript{2}, which traces all
mappings of possible points C\textsubscript{1} into C\textsubscript{2}. Point C\textsubscript{2} actually lies on a
consumption possibility frontier inclusive of external BF\textsubscript{I,II}, of which
we show a portion lying between point C\textsubscript{2} and the A axis (bold concave
curve). The difference between the optimality conditions for the case
of no non-market benefits and for the case in which non-market benefits
are present is that in the latter case, \( \text{MRS}_{A,B} \) should equal to \( \text{MBTT}_{II} \)
or the slope of EXECON's offer curve starting from point T, while in the
former case, \( \text{MRS}_{A,B} \) should equal to \( \text{MBTT}_{II} \) or the slope of EXECON's
offer curve starting from point S. Thus \( \text{MRS}_{A,B} \) can be different at
points C\textsubscript{1} and C\textsubscript{2} (although this is not so in Figure 6 because of the shape
of the indifference map). Consequently, the position of point C\textsubscript{1} (where
indifference curve \( U_1 \) is tangent to locus BF\textsubscript{I,II}) in the case of no non-
market benefits can be different from the position of point C\textsubscript{1} (fixed by
the position of point C\textsubscript{2} and the factor proportions used in POLECON's domes-
tic production of defense) in the case when non-market benefits are present.
FOOTNOTES

1 This statement does not refer to the welfare position of Eastern European countries and it does not reflect the behavior exhibited during the 1950s. We are dealing strictly with the Soviet Union's viewpoint.

2 The term two-way terms of trade implies that a given amount of good A can be exchanged for a particular amount of good B on the world market, which in turn can be exchanged again for the original amount of good A and vice versa. The term one-way terms of trade implies that a given amount of good A can be exchanged for a particular amount of good B but this amount of good B can be exchanged again only for a lower than original amount of good A or vice versa. This is illustrated in Figure 1 below when POLECON can export good B to EXECON in exchange for imports of good A at the terms of trade labeled TT₁ but would be able to import good A in exchange for export of good B at the terms of trade TT₂, which are less favorable from the importer's point of view than those labeled TT₁.

3 When trade balances for different commodity categories tend to go to zero over time we feel this implies an absence of subsidization.

4 This classification is fairly similar to the one proposed by Andrzej Korbonski [1980], who considered the political value to Soviet Union of each Eastern European country as an aggregate sum of its economic, strategic-military, "proxy," and ideological "values" (p. 5).

An alternative framework for explaining how a country with super-power aspirations can use trade policy to advance her political-economic power was developed by Albert O. Hirschman [1945] thirty-five years ago. Hirschman sees foreign trade having two principal effects upon the power position of a country with superpower aspirations. First, Hirschman defines the supply effect to include economic gains from trade that increase the economic power of the dominant country. Second, foreign trade becomes a direct source of power if other smaller countries become economically dependent on the dominant country and thus provide it with an instrument of coercion. This effect Hirschman calls the influence effect. Then the power to interrupt or redefine commercial relations with a dependent country is the root cause of the influence or power position which the dominant country acquires over other nations. The influence effect requires that the dependence of the trade partners on foreign trade must be greater than that of the dominant power. Under such circumstances, dependent countries will likely grant the dominant country certain economic, political, and military advantages in order to maintain stable trade relations. Such
dependency is enhanced to the extent that the smaller countries cannot dispense with trade with the dominant country, or replace it as a market and a source of supply. See Paul Marer [1979], pp. 27-28.

Also notice that in the case of benevolent interdependent utility functions, purely altruistic motives could lead to preferential trade treatment.

5 An excellent example of the calculus of conventional economic benefits and costs in the case of Soviet-East European economic relations from the Soviet perspective is presented in Marer [1979] Sections A and B in the table presented on p. 9a.

6 See Mancur Olson, Jr., and Richard Zeckhauser [1966], p. 272.

7 For a different opinion concerning the external diseconomies of alliance formation for particular groups within a country, see Bruce M. Russett [1968], p. 65.

8 The term "generate" refers to one country's attempt to influence the quantity of external benefits it receives by making a payment, either directly or indirectly, to the country from which the benefits come. If a country does not attempt to generate external benefits this does not imply that the external benefits will be zero.

9 The term "purchase" is a direct means of generating an external benefit in the sense that the payment does not alter the terms of trade.

10 This public good may not be a pure public good since the insurance services offered to the neighboring country may not be as complete as those offered to the domestic population and since the insurance services may depend to some degree on the cost share donated.

11 This bargaining process may be constrained heavily by historical considerations or agreed upon price generating rules, such as a lagged function of world market prices. We believe the bargaining process will be situation-specific. See Thomas C. Schelling [1960] for a general discussion of bilateral bargaining as a way of analyzing international interaction.

12 Even quota rights, preferential (below market) credit arrangements for bilateral trade and preferential tariff treatment can be translated into changes in the terms of trade. Thus they, too, may be viewed as implicit export and import subsidies.
The undiscounted "grant element" in one dollar worth of exports equals \((1 + r_m)^T - (1 + r_e)^T\). Discounted by the prevalent market rate of interest, the "grant element" becomes \([((1 + r_m)^T - (1 + r_e)^T)/(1 + r_m)^T]\) which in turn is equal to the expression above.

A similar calculation was made earlier by Theriot and Matheson [1979], Table 4, p. 560.

Since 1976 Soviet import prices for Cuban sugar are linked to a basket of prices for basic Soviet exports to Cuba. Moreover, the base price chosen in 1975 was $660/metric ton, based on the all time high world market price of sugar in 1974 of $654/metric ton. In comparison, during 1976-1979 the world market price of sugar moved in the $170-$255 range. See Theriot and Matheson [1979], pp. 555 and 559. For an example of Cuba engaging in proxy intervention, see Rodney Tasker [1980], p. 22, for a description of Cubans piloting MiG 21 fighters based in South Yemen and training South Yemen's 18,000 man army. Also on p. 22, Tasker comments on the clear connection between the recently signed friendship pact with the Soviet Union and South Yemen's loss of sovereignty: "The South Yemen Government probably has a more substantial relationship with Moscow than any country outside the Warsaw Pact. Under a 20 year friendship treaty signed in Moscow last October with South Yemen's president at the time, Abdul Fatah Ismail, Aden in effect surrendered a great deal of its independence and sovereignty. Almost incredibly, if reliable reports of the treaty's secret clauses are to be believed, South Yemen agreed to inform the Soviet Union of all its internal and external political proceedings, and accepted that it 'must not take any political initiative of any kind' without consulting Moscow."

Theriot and Matheson [1979], p. 560.

For more detail, see Vaňous [1980a], Appendix, Table 20, or Vaňous [1980b], Table 1.

Our ranking of Eastern European countries according to each's strategic importance to the Soviet Union (from high to low) is: East Germany, Czechoslovakia, Poland, Hungary, Bulgaria and Romania. Our ranking of political allegiance to the Soviet Union (from high to low) is: Bulgaria, Czechoslovakia and East Germany in one group, followed by Poland, Hungary and Romania. Finally, our ranking of fuel endowments (from poor to rich) is: Bulgaria, Hungary, East Germany, Czechoslovakia, Romania and Poland.
Constant preferential terms of trade \( TT_{II} \) would enable \( \text{EXECON} \) to earn "excessive" profits from arbitrage. Thus the amount of exports of good B will be constrained by \( \text{POLECON} \) so that only a certain percentage of \( \text{EXECON} \)'s "needs" is satisfied.

Naturally, it is possible that \( \text{EXECON} \) will trade with \( \text{POLECON} \) only. This case is discussed below and is depicted in Figure 4 in Appendix I.

As is pointed out in Appendix I, when \( \text{POLECON} \) trades only with \( \text{EXECON} \), the optimality condition becomes \( \text{MRS}_{A,B} = \text{MBTT}_{II} = \text{MRT}_{A,B} \).

By \( \text{EXECON} \)'s point of view, we mean \( \text{EXECON} \)'s preferences for goods A and B, neither of which represents sovereignty. Figure 3 refers to \( \text{EXECON} \) being confronted with "certain association" with \( \text{POLECON} \) and, in effect, some transfer of goods A and B from \( \text{POLECON} \). Under these conditions, \( \text{EXECON} \) wants as much transfer as is available.

The former model is more general because it allows substitution between goods A, B, and C (defense services) in the utility function.

See Footnote 7.

See, e.g., M. Chacholiades [1978], pp. 493-494.

Naturally, in the absence of non-market benefits generated in \( \text{EXECON} \), the amount of trade between \( \text{EXECON} \) and \( \text{POLECON} \) would decline.

If \( \text{EXECON} \) can induce \( \text{POLECON} \) to increase their mutual trade by offering external military benefits to \( \text{POLECON} \), this would rationalize the actions of \( \text{EXECON} \)'s leaders. While Figure 6 shows a case in which the presence of external military benefits available to \( \text{POLECON} \) in \( \text{EXECON} \) does not result in any change in the volume of mutual trade, a different shape of \( \text{POLECON} \)'s preference map may lead to an increase in mutual trade in the presence of external military benefits.