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A FRAMEWORK FOR ANALYSIS OF BILATERAL TRADE AND COUNTERTRADE:
THE CASE OF THE CMEA COUNTRIES

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A Framework for Analysis of Bilateral Trade and Countertrade:

The Case of the CMEA Countries

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ABSTRACT

The theory of international trade has paid little attention to the issues that arise when bilateralism is an important element of a country's trade relations. Such a lacuna impedes the ability of the economic analyst to assess creditworthiness and to formulate policy advice for countries that conduct a significant share of trade within the framework of bilateral agreements. Moreover, the analyst also faces difficulties in merely evaluating the information embodied in trade statistics obtained from such countries. The present paper constitutes an initial attempt at formulating and solving some of the problems of economic analysis that arise when bilateralism and non-convertibility are important features of trade. The discussion focuses on the case of the CMEA countries. However, it should be emphasized that many of the paper's arguments are implicitly relevant to nations that participate heavily in countertrade.

The investigation begins with a brief stylized description of the trade processes of CMEA countries. The emphasis is on identifying the distinguishing features of CMEA trade behavior. Then the paper examines the most common errors of analysis that occur when one ignores the special characteristics of bilateral trade in general, and CMEA trade in particular.

The ensuing theoretical discussion establishes results that can be used to analyze commercial policy under bilateralism and to construct economically meaningful statistics from trade and debt data denominated in non-convertible currencies. The discussion suggests that one should construct shadow prices of the transferable ruble in dollar terms. Shadow price formulae are developed and their application is considered in a variety of contexts. A further contribution of the theoretical analysis is that it helps to identify concepts that are important in analyzing the effects of bilateralism.

The paper also examines the possibilities of applying the shadow price formulae in a practical setting. Previous empirical work on the valuation of the transferable ruble is discussed and possible sources of data are reviewed. Suggestions are made concerning different approaches to valuation, conducted at varying levels of sophistication. The paper concludes with an example of the application of an extremely simple method of revaluing transferable ruble trade flows.

The analysis leads to the compilation of a checklist of information on institutional rules and practices needed for a realistic assessment of creditworthiness and trade performance of a country with a sizeable countertrade share (Appendix B).

Vladimir, a Russian dog-owner, told his friend Igor that he was planning to sell the animal. "How much?", asked Igor. "Two thousand roubles", replied Vladimir confidently. "You must be joking", said Igor, "that mongrel will be lucky to get two hundred roubles." A few days later, Vladimir met Igor again and told him that he had sold the dog -- and for two thousand roubles at that. Igor was astonished. "Nothing to it", said Vladimir. "I went into a pet shop and the man there happened to have two cats for sale at a thousand roubles each."

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I. Introduction

1.1 As one of its central elements, the theory of international trade and finance employs the assumption of multilateralism. Trade is assumed to be conducted in convertible currencies. Each country, therefore, faces a single balance-of-payments constraint. While this assumption may be viewed as a reasonable approximation for a majority of international transactions, in an important subset multilateralism does not hold. Trade within the Council for Mutual Economic Assistance (CMEA) is carried out effectively on the basis of bilateral balance. Each CMEA country, therefore, simultaneously faces a number of balance-of-payments constraints. Moreover, a degree of bilateralism can occur in trade between market economies to the extent that countertrade contracts require bilateral balancing of subsets of a country's trade.

1.2 There exists little theoretical analysis of the international trade behavior of countries facing multiple payments constraints. (In the Handbook of International Economics (Jones and Kenen, 1985), there is no mention of bilateralism and non-convertibility). This theoretical lacuna, of course, impedes our ability to understand and predict the behavior of CMEA countries. On a more practical level, one faces difficulties in merely evaluating the information embodied in trade statistics. For example, existing theory cannot be brought directly to bear on a discussion of the following question: given that a particular country is running surpluses on some trade accounts and deficits on others, how can one decide whether the country's external financial relations are fundamentally out-of-balance or not? 1/

1.3 The present paper constitutes an initial attempt at formulating and solving some of the problems of economic analysis that arise when bilateralism and non-convertibility are important features of trade. The discussion focuses on the case of the CMEA countries. Given the distinctive characteristics of those countries, it would not be possible to discuss countertrade simultaneously, without adding undue complexity. However, it should be emphasized that many of the paper's arguments are implicitly relevant to countertrade. That relevance is made explicit in Appendix-A.

1.4 Before turning to the detailed arguments of the paper, it is informative to state some of the main questions that arise when bilateral trade flows exist. These questions are posed in the context of a simple hypothetical example. In the example, there are two areas - 'West' and 'East'. In East-West trade, convertible currencies are used. Each Eastern country is faced with a single multilateral balance, denominated in \$'s, that summarizes all Western transactions. Trade between Eastern countries is denominated in 'transferable rubles' (TR's) and conducted under conditions of strict bilateralism. TR's earned in one country cannot be used in another. Moreover, although an official exchange rate exists between the \$ and TR, it is purely an arbitrary accounting rate. Comparisons of monetary aggregates made at that rate do not lead to accurate comparisons of the real magnitudes corresponding to those aggregates.

1.5 In our example, let us assume that the East comprises five countries, labelled A to E. The external financial statement for each country consists of five balances, one with the West and one with each of its neighbors. Consider a possible scenario summarized in the following statistics showing the current account balances of five countries:

Current Account Balances

	West (\$'s)	East (TR's)					World Total Assuming Official TR /\$ rate (\$'s)
		A	B	C	D	E	
A	-1000	*	0	0	0	0	-1000
B	-500	0	*	+250	0	-750	-1000
C	0	0	-250	*	-250	-500	-1000
D	0	0	0	+250	*	-1250	-1000
E	0	0	+750	+500	+1250	*	+2500

1.6 We are primarily interested in analyzing A, B, C, and D (E being a large country able to balance trade easily by using its natural resource base.) The general question to be asked is the following: what can be said about the relative degree of severity of the payments problems faced by each nation? Standard international trade theory brings little to bear on this problem and, indeed, might invite misinterpretation of the data at hand. For example, in the case of A, one might be tempted to examine convertible-currency trade in isolation, since such trade is the usual focus of standard theory. But the severity of A's problems cannot be judged without taking into account the character of A's trade in the East. For example, even though A's deficit with the West is twice B's, A surely does not have twice B's problems, given the differences in the Eastern trade balances.

1.7 Because of the lack of any alternative in existing theory, one could be tempted to aggregate all of one country's balances using the official exchange rate. (This temptation is often enhanced because official publications frequently report all figures in one currency.) If the official exchange ratio were one-to-one, one would be forced to conclude that A, B, C, and D face balance-of-payments difficulties of equal gravity. There is no

economic justification, however, for using the official exchange rate. One cannot even aggregate the figures denominated in TR's because, for example, the 250TR that B has earned in C cannot be used to pay E. Moreover, a TR used in trade with one country may not have the same real value as a TR used elsewhere. But, possibly, an aggregation could be made at some exchange rate. Given the usefulness of aggregate statistics, one is led to ask the following question:

- (i) Is it reasonable to combine all bilateral and multilateral balances into one summary balance-of-payments figure, or must one always analyze separately as many balances as there are countries (or areas) among which financial fungibility is restricted?

1.8 Obviously a summary trade balance would be extremely useful. For example, the creditworthiness analysis of A, B, C, and D would be aided enormously. But the above example suggests why such aggregation may be difficult. The deficits of A, B, C, and D are with different partner countries. The ease of reducing these deficits must depend upon the characteristics of the different trading partners. Also, A's difficulties are of a different nature than those of B or C because A has only one imbalance to correct. The foregoing discussion suggests the following important questions:

- (ii) Which procedures are available (at differing levels of complexity) for creating aggregate measures of a country's balance-of-payments situation?
- (iii) How does the nature of a country's difficulties differ when its trade imbalances are concentrated in one region from the case in which smaller imbalances are present in all regions? Are there theoretical concepts that help in understanding and evaluating the difference?

1.9 . Often policy analysts require information on a country's payments (or debt) situation that goes beyond a mere balance. Such analysts employ a standard set of indicators (e.g., debt-service to export ratios) to measure the severity of a particular imbalance. When there is bilateralism, this set of indicators must be changed. The above example, again, illustrates the problem. Suppose that under a regime of multilateralism an analyst would compare the size of debt-service to the level of exports. Would this analyst compare A's \$1,000 imbalance to A's exports to the West or to some aggregate measure of total exports? How would one create this aggregate export measure? Thus, it is important to address the following question:

(iv) How should one measure the total severity of a country's trade imbalances (or debt burdens), given that the imbalances can simultaneously occur at different levels in different regions?

1.10 In the discussion above, the questions of interest have been stated as they might occur to an economist interpreting payments data. The posing of those questions, however, naturally leads to the examination of one fundamental issue. The underlying concern over a country's balance-of-payments problems is that, at some time, deficits must be rectified. Policy-oriented economists want to know how significant the ensuing adjustments in the economy will be. The best measure of the size of the adjustments is, of course, the share of the country's real resources that have to be removed from alternative uses to solve the payments problem. Hence, under bilateralism, in order to evaluate fully a country's payments (or debt) situation, one must be able to address the following question: For every nation with which a country trades, what share of a country's real resources would be needed to liquidate a payments imbalance (or debt) of a given size with this nation? An answer to

this question must inevitably lie behind any rigorous analysis of the meaning of balance-of-payments figures under bilateralism.

1.11 When considering the effects of bilateralism, the issues that arise go beyond the reinterpretation of payments and debt data. Given that trade is now conducted in several separate regions, the usual lessons that economic theory provides for the formulation of policy might be inappropriate. Therefore, this study also addresses the following question:

- (v) Which policies must be modified due to the existence of bilateralism and what extra considerations must now be introduced into policy analysis?

1.12 The above questions could be answered at many different levels of precision. At one level, a country analyst might make an educated guess at the shadow price of a TR in \$ terms for a particular country; at the other extreme, one could generate results from a computable general equilibrium model. The investigation in this paper does not center on questions of the appropriate level of analysis. Rather, the purpose is to identify the important general issues that must be faced at any level of analysis and to make suggestions on how these issues should be addressed.

1.13 The investigation proceeds in a number of steps. Section II contains a stylized description of the trade processes of CMEA countries. The emphasis is on identifying the distinguishing features of CMEA trade behavior and relating those features to the issues raised in the above paragraphs. Section III identifies the errors that can be made when one ignores the special characteristics of bilateral trade in general and CMEA trade in particular. The purpose of that section is to alert policy analysts to the difficulties that bilateralism presents in an examination of trade and balance-of-payments

issues.

1.14 Section IV examines, in a theoretical manner, the ways in which one might construct aggregate statistics on trade and debt. In that section, it is argued that one should construct shadow prices of the TR and the \$ in order to undertake such aggregation. Shadow price formulae are developed and their application is considered in a variety of contexts. In formulating the theoretical analysis, one naturally uses concepts derived from economic theory. Many of these are familiar economic concepts, but some are relevant only in the context of the CMEA - for example, the distinction between hard and soft goods. By conducting the theoretical analysis in a rigorous manner, one naturally identifies the concepts that are important in analyzing the effects of bilateralism. Such identification lays the ground for future research by identifying the areas in which future theoretical and empirical work must be undertaken. Appendix B summarizes some of the lessons of section IV in a manner that is particularly useful for the country analyst. It translates the lessons into a checklist of questions for which one would need specific information, if one is to understand more fully the foreign trade behavior of a CMEA country.

1.15 Section V examines the possibilities of applying the shadow price formulae in a practical setting. That section reviews previous empirical work on the valuation of the TR in \$ terms and discusses possible sources of data. Suggestions are made concerning different approaches to valuation, conducted at varying levels of sophistication. Section V concludes with an example of the application of an extremely simple method of revaluing TR trade flows. The example shows how much can be gained from investing a minimal amount of effort into the construction of more meaningful statistics. The

application is to Romanian data for the 1980's. It is shown that dramatic differences in conclusions can result when one values intra-CMEA data at approximate shadow exchange rates rather than official rates.

II. A Stylized Description of Some Important Features of Trade Within the CMEA

2.1 Trade within the CMEA is conducted under a set of principles wholly different from those present in the international transactions of market economies. The member countries of the CMEA accept its arrangements, perhaps grudgingly, and adapt policies accordingly. When conducting policy analysis of the centrally-planned economies, therefore, one must remain alert to the distinctive elements of trade relations within the CMEA.

2.2 The present section examines the distinguishing features of trade within the CMEA. The intention here is not to explain the reasons for the existence of these features. To do so would require an extended discussion of the political economy of the origins and development of the CMEA. ^{2/} Such discussion would aid little in the present exercise, both because of the limited extent of our knowledge of intra-Eastern European politics and because the basic arrangements affecting trade within the CMEA evince such stability that one can take such arrangements as fixed. Therefore, the focus in the following is not on analysis of cause and effect, but rather on description.

2.3 The ensuing sub-sections describe the important features of trade within the CMEA and explain some of their most immediate implications. Of course, the following description is a simplified image of a complex, poorly understood, reality. What follows serves as the briefest starting point for the analysis, rather than a detailed overview of CMEA institutions.

II(a). Bilateralism

2.4 Trade within the CMEA is conducted on the basis of bilateral agreements between the central economic institutions of member countries. These agreements specify, in great detail, the prices and quantities of goods to be traded (van Brabant 1980, p. 123). The negotiations between each pair of countries take place separately. Every effort is made to ensure bilateral balance on a yearly basis. If an unintended imbalance occurs, the ensuing debt will usually be paid in the following year with an appropriate flow of goods, rather than a financial transaction.

2.5 Since the movement from bilateral balancing to multilateralism can result in welfare gains for all nations, one would expect to see some tendency for multilateralism to arise in the CMEA. This tendency has been observed, but only to a limited extent. Estimates of the proportion of trade conducted outside bilateral agreements vary because of the imprecision of available information, but all seem low. Hewett (1974, p. 15) estimates multilateral trade as 2% of all transactions, Brainard (1980, p. 123) 1.5%, and van Brabant (1977, p. 95) gives a range of 0.4% to 5%. As a good approximation, one can assume that all trade is bilateral.

II(b). The Transferable Ruble

2.6 Trade flows between CMEA countries are usually denominated in transferable rubles (TR's). (See II(c) for a discussion of exceptions). The name of this currency reflects past hopes, rather than present realities: TR's are not convertible. They are only issued to the extent that one nation runs a temporary trade deficit with another; they can only be used in the surplus country by the deficit country and only to buy goods that the deficit country

specifies.^{3/} The official exchange rate of the TR against Western currency is fixed quite arbitrarily. Since this rate is not used as the basis for any real exchanges, it has no economic content. (The TR/\$ cross rates implicit in the exchange rates of local currencies with the TR and the \$ vary across countries. For some nations, the TR/\$ cross rates do have some real content. Discussion of these rates is reserved for section V(b).)

II(c). Trade Denominated in Dollars

2.7 A small share of intra-CMEA trade is conducted using prices set in dollars. It appears that such trade arises because two countries find it mutually advantageous to use prices different from those currently prevailing in TR-denominated CMEA trade. Estimates of the significance of such trade vary. Brainard (1980, p. 121) and Marer (1977, p. 546) set it as high as 10% of CMEA trade, while Marrese and Vanous (1983, p. 100) and van Brabant (1977, p. 354) estimate half this value. As this form of trade tends to threaten CMEA pricing rules, there has been pressure in recent years to reduce its significance.

2.8 Three points of clarification must be made about such trade flows. First, this trade is not necessarily conducted on a multilateral basis. A significant share of dollar-denominated intra-CMEA trade is balanced bilaterally, separately from ruble trade. Second, when such trade is balanced bilaterally, the dollar prices in the transaction might not be equal to world market prices: the dollar appears in such transactions solely as a unit of account. Third, the existence of dollar-denominated intra-CMEA trade does not necessarily imply the possibility of earning a \$ surplus that can be used to balance Western trade deficits.

II(d). Prices in the CMEA

2.9 At the simplest level, one can identify two basic elements in the formation of TR prices. First, the CMEA has a set of rules that trade negotiators are supposed to follow. Elements of these rules include the use of "competitive" world prices and the importance of precedent in establishing a particular price. ^{4/} The price rules, however, are in no sense obligatory, although they do carry some force. The second element in price formation is the striking of bargains between each pair of CMEA countries. As Hewett (1974) has clearly shown, these negotiations produce results that can be at odds with the official pricing formulae.

2.10 Given that the CMEA rules are neither mandatory nor without ambiguity and given that prices are set in many separate bargains, it is not surprising that the level of CMEA prices cannot be predicted using any simple set of hypotheses. Nevertheless, there is agreement in the Western literature on a number of general properties of TR prices. These properties are as follows:

(i) Converted at the official exchange rate of the TR, average CMEA prices lie significantly above world market prices. For the Soviet Union, the calculations of Marrese and Vanous (1983, p. 129) show TR price levels to be 35% higher than world levels on average during 1960-78. ^{5/} Moreover, within every broad commodity group similar results hold. ^{6/}

(ii) The structure of relative prices within the CMEA is significantly different from that in world markets. As a rough approximation, one can say that the extent to which CMEA relative prices are higher than world relative prices is a function of the degree of domestic manufacturing content in a product (i.e., raw materials have a lower

relative price than manufactures). For example, in Soviet trade with Hungary in 1978, Marrese and Vanous (1983, pp. 129-182) estimate TR fuel prices, converted at the official exchange rate, to be 10% above world market prices, while the corresponding figure for machinery and equipment is 140%. There is no single well-accepted theory explaining CMEA relative prices. Explanations abound, ranging from customs union effects to the political motives of the Soviet Union.

(iii) The bargaining over trade flows within the CMEA focuses primarily on quantities and does not seem to be constrained by some pre-existing set of prices. It appears that individual prices are sometimes changed, on a somewhat arbitrary basis, after quantity negotiations are complete, in order to ensure financial balance. Hence, prices for individual goods may not be reliable indicators of the real trade-offs facing an economy. It should be emphasized, however, that the foregoing point does not imply that CMEA prices have no informational content. On average, the prices of goods included in the same balance must approximate the rates of exchange between those goods. However, the prices of goods that appear in different balances might be non-comparable. ^{7/}

(iv) Given that trade between each pair of countries is bilaterally balanced and given that the focus in each set of separate bilateral negotiations is on quantities, not prices, it is not surprising that there can be large price disparities within the CMEA. The same good, produced in the same country, can have very different prices when exported to different countries. Brainard (1980, pp. 122-3) quotes a Hungarian estimate that prices can vary by as much as 20%.

Therefore, a transferable ruble may have different values when used in trade with different partners. In fact, the methodology implicit in Soviet foreign trade planning recognizes this point (Brainard (1976, p. 702)). The estimates of Marrese and Vanous (1983, p. 104) show, for Soviet trade, that average prices normally vary across trading partners by as much as 10%.

(v) In trade relations, as in many areas of activity in centrally-planned economies, there are forces which lead to rigidities. The difficulty of changing complex bilateral trade agreements, the use of precedent to establish prices, and the excessive focus on past results in preparing new plans ^{8/} lead to a price structure that is more rigid than in market economies. In fact, the official CMEA pricing formula, adopted in 1975, codifies this rigidity by employing a five-year moving average formula for calculating prices. One important result of the price rigidity is that rapid changes can occur in the real value of a transferable ruble relative to the dollar. For example, a TR used by Hungary to buy goods from the Soviet Union increased in value by 67% relative to the dollar in 1974 (Marrese and Vanous 1983, p. 182).

II(e). "Soft" Goods and "Hard" Goods

2.11 In the analysis of intra-CMEA trade, an important distinction is always made between two types of goods - hard and soft. These terms are variously defined: soft goods are ones in excess supply in the CMEA region, given present pricing rules, and hard goods are in short supply; or hard goods are ones that can sell for convertible currencies; alternatively, soft goods

are ones that do not meet Western quality and technological standards. In practice, goods are more likely to be soft the higher is their local manufacturing content. Since economists use the terms hard and soft in various ways, the distinction between the terms might be too vague to define precisely. (Some possible definitions of "hard" and "soft" are discussed in section IV(e).) Nevertheless, the distinction does correspond to a very important reality on CMEA markets.

2.12 Regardless of the definition of the difference between hard and soft goods, one very important conclusion follows. Given the present structure of the CMEA and the resultant price rules, countries (with one very important exception - the USSR) are unwilling to trade-off a TR trade surplus in hard goods against a TR trade deficit in soft goods. Therefore, the smaller CMEA countries ensure that hard good trade and soft good trade balance separately (Hewett 1974, p. 113). ^{9/} Given separate balances for different types of goods, there is no reason why a TR used in trading soft goods will have the same value as a TR used for hard goods. As a result of the existence of bilateralism and the distinction between hard and soft goods, CMEA countries face many balances of payments. There is a separate hard and soft good balance with each CMEA partner, as well as the normal multilateral convertible currency balance.

II(f). The Special Case of Trade with the USSR

2.13 In trade between the small Eastern European countries, the separate balancing of hard and soft goods is viable, if not efficient, because relative resource endowments are sufficiently similar between countries. If the Soviet Union insisted on balancing hard good flows, little trade would result, given

the Soviet Union's obvious comparative advantage in raw materials. In order to maintain active trade relations with Eastern Europe, the Soviet Union accepts soft goods in exchange for hard ones. (In practice, this means manufactures for raw materials.) This fact is of the utmost importance because of the sheer size of Soviet trade flows.

2.14 Two important conclusions flow immediately from the special nature of Soviet trade. First, CMEA countries obtain terms of trade from the Soviet Union that are more beneficial than those with the rest of the world. ^{10/} Given that the relative prices of soft goods are higher in the CMEA than on world markets, redirection of trade away from or towards the USSR has important consequences for a country's aggregate terms-of-trade. Second, in order to stop arbitrage by the smaller CMEA countries, the USSR must place constraints on the extent to which hard goods trade for soft. ^{11/} Hence, average terms of trade will be very different from marginal ones, which are a function of the constraints. The value of the TR will therefore depend on the exact nature of the restrictions on trade flows placed by the Soviet Union.

II(g). Deficits

2.15 CMEA rules ensure that interest rates are low on debts incurred as a result of a trade imbalance. Not surprisingly therefore, extensive efforts are made to ensure that trade balances on a yearly basis. There is clear evidence that any imbalances that do arise are reversed in the following year (Vanous 1980, p. 190). Again, however, there is an important exception. When rapid changes in the terms of trade favored the Soviet Union in recent years, some smaller CMEA countries were allowed to incur deficits in order to dampen the speed of the resultant adjustments. Loans to cover such deficits may not

necessarily have the same meaning as loans from the West because interest rates could be low, because such loans have been cancelled in the past (Marrese and Vanous (1983), p. 111), and because the true burden of debt depends upon whether payment must be made in hard or soft goods.

III. On Errors Frequently Committed When Analyzing CMEA Trade

3.1 Both the complexity of procedures within the CMEA and the difficulty of obtaining the relevant statistical information make CMEA trade relations opaque to our understanding. In addition, economists steeped in the analysis of free markets find the behavior of centrally-planned economies resistant to their standard modes of thought. It is therefore unsurprising to find that there exists a tendency for economists to downplay, or to forget, the distinguishing features of CMEA trade when analyzing Eastern European economies.

3.2 The present section identifies some of the errors of analysis that might arise when due attention is not paid to the special nature of CMEA trade relations. Where possible, examples are cited and information that bears on judging the significance of the errors is given. The purpose here is not to criticize the works cited, but rather to give some practical content to the discussion and provide examples of places in which future analysis can be improved.

3.3 The following discussion should not be taken to imply that all problems identified can be corrected. Given the poor quality of statistical information on CMEA trade, the data might not exist to make the necessary amendments. However, even if the appropriate corrections cannot be made, identification of possible sources of error is useful. Knowing the direction of

bias of an analysis is useful in judging the quality of policy conclusions derived therefrom. Thus, while one may not be able to conduct all analysis in the optimal manner, one may be able to improve the judgements that arise from existing analyses.

3.4 When ignoring the nature of CMEA trade, errors of judgement can arise in two ways. First, statistical information can be derived in a manner that makes value aggregates poor representations of real phenomena. Then, the data give misleading information on past economic performance and on future possibilities. Second, partly as a result of the first, inappropriate policy advice might be formulated. The CMEA functions under a very different set of arrangements than do free markets. Policy analysis, therefore, cannot be premised on standard economic principles, without deeper consideration of their applicability in specific situations. Both using inadequate data and neglecting institutional peculiarities can lead to misjudgements concerning the nature of the possibilities open to an economy. In the examples that follow, both types of misjudgments are considered.

III(a). Using Transferable Ruble/Dollar Comparisons
Made at the Official Exchange Rate

3.5 As noted above, the official exchange rate of the transferable ruble (TR) is arbitrary: it does not correspond to any real magnitude. Therefore, one should not use such a rate when converting CMEA trade flows and non-convertible currency debt into dollars. The resultant aggregates can be highly misleading. Hungary's foreign trade statistics show this in a dramatic way.

3.6 The World Bank Country Study, Hungary: Economic Developments and Reforms, (1984, p. 20) states that the share of Hungary's trade with socialist

countries declined from 64% in 1970 to 55% in 1981. This statement has obvious significance in any evaluation of Hungary's reforms. No information is given, however, on how TR and convertible-currency prices are converted into common units in order to make the statement. Given the arbitrary nature of some TR exchange rates, further analysis is necessary in order to determine whether the apparent redirection of trade is anything more than a statistical artifact. ^{12/}

3.7 Consider the following information from the Country Study (World Bank 1984, p. 174-5).

Percentage Share of Socialist Countries in Hungarian Trade

	<u>1970</u>	<u>1975</u>	<u>1976</u>	<u>1980</u>
Exports	63.3	70.0	57.8	52.1
Imports	62.7	64.5	52.3	48.2

Apparently a geographical reorientation in trade occurred in one year, 1975 to 1976. How could this have happened, especially at a time when CMEA fuel prices were rising very rapidly relative to world prices?

3.8 Although a conclusive answer to the above question would require more exact knowledge of the construction of Hungarian foreign-trade statistics, one can hazard an informed guess. In 1976, Hungary changed the rate used to convert TR trade and dollar trade into comparable units. The change, to a rate closer to a realistic value, ^{13/} implicitly devalued the TR by 45% relative to the dollar (Vanous 1981, p. 712). Recalculating the 1975 shares using the 1976 TR/\$ rate, one obtains 56.5% for exports to socialist countries and 50% for imports. The implicit devaluation of the TR seems a more

plausible explanation for the apparent change in the direction of trade than any argument that would focus on changes in real flows. ^{14/}

3.9 Three conclusions follow directly from the above discussion. First, when arbitrary exchange rates are used in constructing aggregate information, arbitrary results can follow. The decline in the socialist countries' share of Hungary's trade may have been more apparent than real. Second, in order to interpret data on total trade flows, the researcher must know which exchange rate has been applied to trade within the CMEA. The third conclusion follows from noting that the exchange rate used in later years was more realistic than the official TR/\$ rate used before 1976. As a consequence, the estimated share of socialist countries in Hungarian trade "dropped" by nearly one-fifth. The use of official TR/\$ rates, therefore, leads to an overestimate of the importance of CMEA trade in a country's affairs.

III(b). Ignoring Ruble Trade

3.10 Some researchers, sensitive to the differences between ruble and convertible-currency trade, adopt a tactic diametrically opposite to the one discussed above. Ruble trade is ignored when analyzing East-West interactions. Since problems of comparison are regarded as large, they are implicitly deemed insurmountable. Ignoring ruble trade, however, leads to two problems: the present economic picture is inadequately summarized and possible future trade-offs are masked.

3.11 The ignoring of ruble trade arises most notably in analyzing the burden of debt. Because dollar debt must be repaid in dollars, analysts are prone to compare the size of repayments to convertible-currency exports alone. Zoeter (1981, p. 730), for example, calculates two measures - debt and

debt-service as a proportion of hard-currency exports. ^{15/} In 1979, those figures show Romania with much less of a debt problem than the GDR. With hindsight, one knows that these figures did not faithfully represent the relative burden of debt on the two countries. But as the following table shows, hindsight was not the only way to gain a more realistic impression of the debt burden. ^{16/}

	<u>GDR</u>	<u>Romania</u>
hard currency debt/hard currency exports	2.39	1.31
hard currency debt/total exports	0.74	0.81
hard currency debt service/hard currency exports	0.55	0.24
hard currency debt service/total exports	0.17	0.15

The simple reason why one obtains a distorted picture when ruble trade is ignored is that Romania's trade is more oriented to the West than the GDR's. Using total exports in the calculations, one obtains a different impression of the adjustment burdens on the economies that the payment of debt was to impose. (Ruble debt can be ignored in the present example because it was insignificant in 1979.)

3.12 Perhaps, at the present stage, it is necessary to counter one possible objection to the above argument. It may be claimed that trade with the CMEA and trade with the West are not substitutes. Therefore, adjustments in CMEA trade cannot help to ameliorate the burden of paying \$ debts. Such an objection probably overstates the degree of rigidity of the Eastern European economies. It also understates the extent to which imports from both regions are substitutes in consumption, thus, allowing the maintenance of the level of imports from one region to reduce the relative burden of a decline in imports

from another.

III(c). Using the Same Exchange Rate in Transactions
With All CMEA Countries

3.13 CMEA countries bilaterally balance trade with each CMEA partner. Because arbitrage is not possible between separate balances, the absolute level of TR-denominated prices can vary between the separate bilateral balances of a single country. Since there is no possibility of trade-off between the separate imbalances, no errors or inefficiencies are implied by such price variations (apart from those already consequent on bilateralism itself). However, errors and inefficiencies can arise if such differences either become embodied in statistical summaries of a nation's performance or affect the structure of domestic prices. For example, price signals may convey incorrect messages about the goods in which a country has a comparative advantage.

3.14 Using a single TR exchange rate in constructing trade statistics leads to problems similar to those discussed in section III(a), albeit on a smaller scale. For example, a geographical reorientation in trade within the CMEA may appear as a change in the volume of trade. Thus, the economy's real performance is masked. Any analysis of future policy directions based on such statistics would be likely to produce incorrect conclusions. The magnitude of possible errors is indicated by the finding of Marrese and Vanous (1983, p. 104) that aggregate Soviet import prices had an average spread of 10% across CMEA countries in the 1970's.

III(d). Using the Same Exchange Rate for All Types of Goods

3.15 Let us suppose that we have found a set of country-specific TR/\$

exchange rates that make average CMEA trade prices equal to average world market prices. However, manufactured goods are relatively overpriced in CMEA trade, compared to world markets. If world market prices are presumed to reflect real values, the use of the average TR/\$ rate will lead to an overstatement of the share of manufactured goods in trade. As a consequence, spurious statistical results can arise.

3.16 Consider, for example, the Romanian machinery sector. According to official Romanian statistics, ^{17/} machinery exports to socialist countries rose by \$680 million from 1982 to 1984, while those to non-socialist countries fell by \$450 million. Aggregating these figures indicates that the machinery sector increased its exports. However, data from Marrese and Vanous (1983, pp. 58-59) show CMEA machinery prices to be more than double world prices when the official exchange rate is used and 50% higher when using an exchange rate that equates average TR prices to dollar ones. Revaluing Romania's exports appropriately, one would conclude that the machinery sector failed to improve its export performance. (See the results in Section V.)

3.17 The misinterpretation of data, pointed out above, occurs because of the erroneous assumption that the same exchange rate must be applied in all transactions conducted in a single currency. This assumption can lead also to inappropriate policy advice, as the following shows.

III(e). Indiscriminate Application of the Law of One Price

3.18 The most basic policy rules that economists employ are invariably derived in analyses that assume free markets. In such analyses, prices and quantities freely adjust to remove disequilibria. The CMEA, however, does not have such adjustment mechanisms. Therefore, indiscriminate application of the

usual policy rules must be questioned.

3.19 One such rule involves the use of only one price for each economic entity. For example, an analyst might advise using a single exchange rate for the TR. Implicitly such advice is proffered when economists comment approvingly on the removal of multiple exchange rate systems. The same premise probably underlies negative remarks on the existence of schemes designed to tax or subsidize specific participants in CMEA trade. ^{18/}

3.20 As has been made clear above, relative prices in the CMEA are not market clearing ones. There are quantity constraints on trade, for example. The transfer of TR's between countries is not possible. Therefore, the law of one price should not be applied to the TR because, in effect, a TR used in trade with a different country is a different economic entity. Furthermore, if hard goods trade and soft goods trade are balanced separately, a TR used to buy hard goods has a different value than one used for soft.

3.21 One can conclude, therefore, that efficient economic policy in an Eastern European economy may require either multiple exchange rates or good-specific taxes or subsidies. In pointing out such a conclusion, the intention is not to minimize the extent to which a bureaucratic system of subsidies and taxes creates incentives to expend efforts on lobbying rather than on production. But such inefficiencies may be a necessary, and worthwhile, cost of providing appropriate incentives in export and import decisions.

III(f). Assuming an Accounting Dollar is a Real Dollar

3.22 Some CMEA trade flows are denominated in dollars. A significant share of this dollar-denominated trade is bilaterally balanced. Therefore, the absolute levels of the dollar prices might have no significance: no

equilibrating forces produce correspondence between these prices and the ones on world markets. The real meaning of CMEA dollar prices is, therefore, unclear.

3.23 When analyzing the foreign trade position of Eastern European countries, careful attention is often paid to the distinction between "socialist" trade and "non-convertible-currency" trade (e.g., World Bank (1984, p. 19)). But this distinction may not carry as much force as is often thought. One cannot presume that CMEA trade denominated in convertible currencies is the same as multilateral trade. Whether this trade has characteristics closer to TR trade or to multilateral trade depends upon the extent to which the dollar-denominated flows between pairs of countries are balanced. Unfortunately, evidence on this point is not easily available.

3.24 Two basic differences occur between bilaterally-balanced dollar-denominated CMEA trade and multilateral trade. First, absolute prices in the former need not conform to those in the latter, due to the absence of equilibrating forces. Care must therefore be taken in aggregating the two sets of trade flows. Second, dollar-denominated CMEA trade usually cannot be used to settle imbalances in other regions. The existence of dollar trade flows within the CMEA does not necessarily imply an ability to generate dollar surpluses in that region.

III(g). Forgetting the Special Character of Commercial Relations with the Soviet Union

3.25 The Soviet Union is a partner in over 50% of CMEA trade transactions (Vanous 1981), which means that Eastern European countries conduct, on average, more than one-quarter of their trade with the USSR. In addition, virtually all non-convertible currency debt is owed to the Soviet Union. The

sheer size of Soviet trade alone would argue for special attention. More important, however, is the fact that the commercial relations of the USSR are conducted in a manner different from those of the rest of the CMEA. ^{19/} To ignore the special character of Soviet trade is to miss a crucial element in the analysis of the Eastern European economies.

3.26 Let us take, for example, the case of non-convertible currency debt. One would like to be able to value this debt in dollars (or domestic currency) in order to obtain some indication of its burden on the economy. But that burden is a function of the manner in which the debt must be repaid. Is the debt a claim held by the Soviet Union on hard goods or on soft ones? The answer to this question is an important determinant of the way in which debt repayments will affect an economy.

3.27 The character of Soviet trade behavior and, in particular, the constraints that the Soviet Union places on its sale of hard goods, must affect the value to be placed on a TR in trade with that country. Systematic examination of the nature of these constraints is a precursor to any careful evaluation of the meaning of statistics on trade flows and debt. In section IV(f), a preliminary attempt at such an examination is given.

III(h). Assuming that a Country's Terms of Trade are Independent of Trade Policy

3.28 In relations between market economies, trade policy focuses on domestic institutions and on the way in which domestic incentives should be structured to produce efficient results. For most countries, given the absence of market power, little is to be gained from considering ways in which the external environment can be manipulated to improve the terms of trade. The character of CMEA institutions, however, is such that a country's terms-

of-trade can be changed by domestic policies.

3.29 The prices offered by the Soviet Union to its CMEA partners are usually more favorable than those existing in trade with market economies. Thus, changes in a country's aggregate terms-of-trade may result solely from a regional shift in trade. In evaluating a country's performance, therefore, attempts should be made to consider the causes of changes in aggregate trade prices. One must separate truly exogenous changes from those caused by regional shifts in trade. Only by doing so, can one accurately evaluate the effect of international economic events on the domestic economy.

3.30 Consider also a policy question: how to affect the classification of goods into hard and soft categories in trade negotiations. Obtaining a classification of hard for a previously soft good may lead to large benefits. If a good is classified as hard when it can sell on Western markets, a country might find it profitable to subsidize Western exports on a good-by-good basis. Such a subsidy would increase the number of goods that can be sold in the CMEA as 'hard' and, therefore, improve the country's terms of trade in the ruble area while worsening \$ terms of trade. (See Section IV.) One need not emphasize that such a conclusion runs counter to received doctrine on trade policy.

IV. On the Measurement of CMEA Trade Flows and Non-Convertible-Currency Debts

IV(a) The Shadow Price Approach

4.1 The focus of the present and following sections is on how to generate the information that can best summarize the foreign economic relations of CMEA countries. Of course, it is always possible to suggest new items of data that should be collected in order to improve accuracy. But that is not the

approach taken here. Rather, the amount of data available is taken as given, essentially dictated by the domestic authorities. The present examination centers on the ways in which one can improve the quality of information derived from that given set of data.

4.2 The problem at hand can be simply described. One has two sets of data on both trade flows and debts. ^{20/} One set is generated by bilateral agreements and denominated in transferable rubles, the other arises within a multilateral payments system and is given in dollars. ^{21/} Since there is no market in TR's, no equilibrium exchange rate exists at which one can compare the two sets. The natural approach is to use economic theory to derive the analog of such a rate and then to examine whether one can estimate that analog using currently available data. The theory is developed in the present section; the review of existing data sources is given in section V.

4.3 Before proceeding to the analysis, it is useful to justify why converting the two data sets into common units is both informative and possible. When there are choices to be made between alternative paths of action, it is informative to express all variables in the same units in order to know the trade-offs relevant to the choices. Consider an example. When similar goods are traded in both the CMEA and the West, debts can be paid by readjusting exports and imports in a variety of ways in both regions. Two simple scenarios for paying a \$1 debt are as follows: reduce domestic consumption of goods that can be sold in the West and, consequently, increase \$ exports; or, reduce domestic consumption of goods that can be sold in the CMEA in order to increase CMEA exports to pay for additional imports of, say, energy from the CMEA, consequently reducing energy imports bought with \$'s. In order to assess these scenarios, one must be able to compare the domestic

opportunity costs of obtaining a unit of currency in each region and to compare the relative amounts of energy that each unit of currency can buy. TR/\$ conversion ratios are implicit in each of these comparisons.

4.4 In summary, one translates TR and dollar values into the same units for exactly the same reason as one converts other economic magnitudes (e.g., production or consumption figures) into common measures. Only by doing so, can one take stock of the economy's present situation and evaluate the future trade-offs facing the economy.

4.5 Now let us turn to the question of whether it is possible to compare TR and \$ figures in a meaningful way. The answer is based upon the observation that trade is simply a means to enhance economic welfare, not an end in itself. Thus, one can view trade in the same way that one views any productive activity. Expressing TR and dollar flows in common units is exactly equivalent to placing monetary valuations on goods produced by two different industries. One values goods by considering the relative contributions to economic welfare that can be produced by incremental units of each good. ^{22/} Since currencies are not themselves objects of welfare, the value of a currency is the contribution to economic welfare that is derived from the goods that can be obtained with an incremental unit of the currency. This approach to valuing a currency is simply the shadow price technique.

4.6 Much of the economics literature on the calculation of shadow prices centers on the difficult methodological issues of valuation in the presence of economic distortions. Given the available information on the socialist economies, the present discussion must have a different purpose. ^{23/} Here, the focus is on the most basic issues, gaining insights from simple economic models that embody elements of the stylized description of CMEA trade deve-

loped in Section II. The goal is not to show how to apply the most advanced techniques of shadow price calculation. Rather, the intention is to suggest ways in which comparisons of TR and dollar values can be constructed in a manner that significantly improves on present practice.

4.7 The ensuing discussion has a broader focus than solely the presentation of shadow price formulae that can be used to reinterpret existing data. The shadow price approach is not only helpful as a means of valuation when data is available, it also provides a framework for organizing a more general analytical discussion. This approach helps to clarify which variables, parameters, and relationships should be relevant when one is trying to understand a particular economic phenomenon. Therefore, as a natural consequence of the following analysis, conclusions are derived that are of wider relevance than simply providing a means of valuing trade flows. In particular, the discussion provides information in the following areas:

- (i) The inaccuracies of analysis, loosely described in section III, are systematically examined. The source of such inaccuracies is rigorously derived in order to better understand the problems that occur in present policy analysis.
- (ii) Theoretical constructs that are useful in examining CMEA trade flows are identified. The purpose in such identification is to become aware of the areas in which theoretical developments are required, if policy analysis of socialist economies is to be improved.
- (iii) Suggestions are made concerning the most important areas in which better data collection could improve the statistical analysis of CMEA trade flows.

IV(b). The Model and Notation

4.8 The details of the model underlying the present discussion are presented in Appendix C, together with the derivations of the main results. Here, the main features of the model are summarized and the results are presented in an heuristic fashion. In most cases, readers will find satisfactory justification of the results in intuitive arguments: often, the model is solely a formalization of common-sense notions.

4.9 The basic features of the model are as follows:

- (i) Domestic distortions are not taken into account. To do so would require modelling the internal behavior of centrally-planned economies. Given the lack of a well-articulated theory of these economies, such modelling is beyond the scope of the present exercise. Thus, it is assumed, for example, that domestic authorities freely choose internal prices: no pre-existing set of tariffs determines the relationship between foreign and domestic prices.
- (ii) It is assumed that trade and production patterns are consciously chosen in order to maximize economic welfare.
- (iii) Within the CMEA, trade with each single partner country is distinguished. In such a way, bilateral balancing is introduced into the model.
- (iv) Trade conducted on a multilateral basis is treated as trade with a single entity - the rest-of-the-world.
- (v) For CMEA countries other than the Soviet Union, it is assumed that hard goods trade and soft goods trade are balanced separately.
- (vi) Explicit attention is paid to the ways in which one might model the

constraints on trade imposed by the Soviet Union. The effect of the constraints on the valuation of trade flows is examined.

(vii) International trade prices are assumed to be fixed. Bargaining and market power are absent from the model. Thus, the results are relevant for a small Eastern European country.

(viii) Solely to simplify the presentation, results on bilaterally-balanced dollar-denominated intra-CMEA trade are not derived within the model. However, one can easily derive conclusions about the valuation of such trade by extending the model's results in a straightforward manner. (The discussion of III(f) shows that the \$'s used in bilaterally-balanced intra-CMEA trade must be treated as a third currency: one cannot assume that the prices used in such trade are simply related to either TR prices or to world-market prices. Then, all the results on the valuation of the TR would apply, mutatis mutandis, to the valuation of this third currency.)

4.10 Unfortunately, the notation that must be used to define the shadow price formulae is somewhat cumbersome. This is due to the necessity of taking into account a variety of different types of trade flows within one model, rather than from any intrinsic complexity in the analysis itself. In fact, in most cases, the shadow exchange rates can be defined in simple intuitive ways.

4.11 Each price or quantity variable has three subscripts. The first, whose general value is denoted by a "g", indicates the type of good. It is crucial to the analysis to distinguish three types of goods - those traded in convertible-currency markets (subscript w), those sold in the CMEA as hard goods (h), and those sold in the CMEA as soft goods (s). The second subscript, whose general value is a j, indicates the partner country in a

trade. When the trade is conducted on a multilateral basis, the identity of the partner country is of no consequence and the second subscript is a "\$". The third subscript identifies the traded good and has the general value i . To economize on notation, i is always used for the goods index. However, it should be borne in mind that when two variables have the same third subscript, but different first subscripts (w , h , or s), different goods are indicated.

4.12 To simplify, the notation does not include an element for the "home" country that is being examined within the analysis. Thus, in the following, all variables are assumed to be defined with respect to one country - a typical small Eastern European country. The basic variables defining trade flows are:

P_{gji} - foreign currency price of the i th good of type g exported to country j

X_{gji} - quantity of the i th good of type g exported to country j

R_{gji} - domestic price of the i th good of type g exported to country j

Q_{gji} - foreign currency price of the i th good of type g imported from country j

M_{gji} - quantity of the i th good of type g imported from country j

S_{gji} - domestic price of the i th good of type g imported from country j

The subscripts have the following ranges:

$g = w, s, \text{ or } h$

$j = \$, \text{ Bulgaria, Czechoslovakia, } \dots, \text{ USSR.}$

$i = 1, \dots, n_{gj}$

where n_{gj} is the number of different goods of type g traded with country j .

4.13 In order to present the basic results in a concise manner, it is helpful to define the following indices:

$$E_{gj}^X = \frac{\sum_i P_{gji} X_{gji}}{\sum_i R_{gji} X_{gji}} \quad (1)$$

= foreign currency value of exports of type g to country j
domestic value of exports of type g to country j

$$E_{gj}^M = \frac{\sum_i Q_{gji} M_{gji}}{\sum_i S_{gji} M_{gji}} \quad (2)$$

= foreign currency value of imports of type g from country j
domestic value of imports of type g from country j

Given that the convertible-currency area is defined as one "country" and that there is no distinction between hard and soft goods in that area, only two of the above indices contain \$ figures: $E_{W\X and $E_{W\M . There is a multitude of indices containing TR figures, however: for each country j, one has

$$E_{hj}^X, E_{sj}^X, E_{hj}^M, \text{ and } E_{sj}^M.$$

IV(c) Valuing Trade Flows

4.14 The first results focus on valuation when hard good and soft good trade are balanced separately and when there are no constraints on the level of trade. These results are most applicable to trade between small CMEA countries. The following establishes the irrelevance of the official TR/\$ exchange rate.

PROPOSITION 1: The shadow price of the TR is independent of the official TR/\$ exchange rate.

The source of this result is obvious. No transactions are undertaken at the official exchange rate and, therefore, that rate cannot influence real behavior. Given Proposition 1, one should be wary of any statistics constructed using official currency valuations. 24/

4.15 The next result establishes the basic formulae for calculation of shadow prices. (Questions of data availability are not examined here. They are reserved for Section V.)

PROPOSITION 2: When domestic distortions can be ignored, trade of type g ($= h$ or s) with country j should be converted into $\$$'s using the following conversion factors:

$$C_{gj}^X = E_{w\$}^X / E_{gj}^X \quad \text{or} \quad C_{gj}^M = E_{w\$}^M / E_{gj}^M$$

The intuition behind the proposition is simple. If domestic prices reflect social valuations, then the denominator of each "C" is the inverse of the social value of one TR. The numerator reflects the social value of one $\$$ in a similar manner. The ratio, then, reflects the relative social value of the $\$$ versus the TR.

4.16 In interpreting this proposition, one should bear in mind the following:

- (i) If there are no distortions, $C_{gj}^X = C_{gj}^M$. If these differ significantly, one would need to investigate the reasons for the difference before deciding which to use.
- (ii) In calculating the E's, it is not necessary to include all trade flows. (That is, the summations in formulae (1) and (2) need not vary over all i .) The index can be calculated using a representative sample of goods.
- (iii) The previous point implies that if one can find a set of goods that are traded in both the CMEA and the West, one can simplify the calculations. C_{gj}^X and C_{gj}^M would each become simply the ratio of the $\$$ value of a market basket of this set of goods divided by the TR value of the same market basket. This is the approach followed.

by Marrese and Vanous (1983,1984) who value Soviet trade flows (i.e., the market basket) in both TR's and \$'s. The problem with this approach is finding a set of goods that is traded in both regions. ^{25/} Marrese and Vanous (1983) finesse this problem by estimating quality differences between goods traded in the West and those sold within the CMEA. They then construct quality-adjusted prices and assume that such prices can account for all differences in the social values of goods traded in the two regions. Their 1984 study improves upon this methodology by using Polish and Hungarian trade data for a limited number of commodities that are traded in both the East and the West, to estimate the numerators of the E's.

4.17 The following are corollaries of the previous proposition:

PROPOSITION 3: When hard-good and soft-good trade are balanced separately, there is no necessary connection between the shadow price of a TR used in hard goods and one used in soft goods (i.e., in general, $E_{hj}^X \neq E_{sj}^X$ and $E_{sj}^M \neq E_{hj}^M$).

PROPOSITION 4: When trade is bilaterally balanced, there is no necessary connection between the shadow prices of TR's used in trade with different countries (i.e., in general,

$$E_{sj}^X \neq E_{sk}^X, E_{sj}^M \neq E_{sk}^M, E_{hj}^X \neq E_{hk}^X \text{ and } E_{hj}^M \neq E_{hk}^M, \text{ when } j \neq k).$$

These two propositions simply formalize the discussion of section III. They show that trade flows occurring in separate balances must be converted into \$'s at different rates.

4.18 It is fitting to comment on the relationship of the above formulae to those existing in the economics literature. All that is new in the above

is the adaptation of existing results to the special circumstances of bilateralism and the separate balancing of different types of goods. The above results are much simpler, and more clear cut, than those in the literature because no domestic distortions are taken into account. It is only in the presence of distortions that the various shadow price formulae existing in the literature significantly differ. Thus, the present approach is consistent with most existing derivations of foreign exchange shadow prices. ^{26/} Significant in the present context is the consistency with Kornai's (1967, p. 306) methodology.

4.19 Propositions 3 and 4 lead to an important conclusion relating to the commercial policy of CMEA countries. These countries face an enormously complex external environment. For example, there will be four implicit exchange rates in trade with each of the CMEA trading partners. Many separate trade balances must be supervised simultaneously. To manage such a system is in itself an extremely complex administrative task. When advising on commercial policy, analysts must remain sensitive to fact that their usual advice might be very difficult to implement in such a complex environment. Consider, for example, market research for export promotion. In a multilateral environment, the exporter need only examine the foreign demand for the export. When such research is directed at a trading partner who insists on bilateralism, the demand for exports cannot be estimated independently of the trading partner's ability to produce goods suitable for exchange. Study of the market for exports becomes inseparable from analysis of the ability to benefit from imports, if gains from trade are to be generated.

IV(d). Valuing Debt

4.20 A debt constitutes a claim on a country's resources. Given the normal equilibration processes present in international trade, one does not usually need to specify which goods are subject to the claim. At the margin, any mode of debt payment will affect welfare in the same way. However, the real value of one TR of goods depends upon the goods in question. Thus, the real burden of a TR debt is unknown, unless further information is available.

4.21 The crux of the problem is that soft goods are relatively overvalued in trade: 27/

$$C_{sj}^x < C_{hj}^x, \quad C_{sj}^M < C_{hj}^M.$$

The burden of a TR debt will depend on the proportion of hard goods that must be used to pay the debt. Hence, one needs information about a further variable. Define a_j as the proportion of the debt owed to country j that constitutes a claim on hard goods. Then one has:

PROPOSITION 5: A TR debt should be converted into \$'s using

$$\text{either } a_j C_{hj}^x + (1 - a_j) C_{sj}^x \quad \text{or} \quad a_j C_{hj}^M + (1 - a_j) C_{sj}^M,$$

which are equal under the assumption of no distortions.

The proposition is little more than a tautology. Its usefulness derives solely from the fact that it identifies a crucial parameter in the valuation of debt: a_j . The proposition, therefore, points the direction that future theoretical and empirical work should take. Obtaining an accurate representation of a small CMEA country's debt position would require investigating the conditions placed by the Soviet Union on the liquidation of debt.

4.22 In the analysis of a country's debt situation, one usually requires more than simply a figure on total debt. A measure of a country's ability to

pay is also useful. Usually, this measure is found by comparing debt or debt-service to exports. In the case of the CMEA, however, one must consider whether the comparison should be against total exports or only those exports to the region in which the debt is owed. Some additional notation will help clarify the issues:

D^c = convertible currency debt-service measured in \$'s,

D^n = non-convertible currency debt-service measured in \$'s using a shadow TR/\$ rate,

F^c = convertible currency exports measured in \$'s,

F^n = non-convertible currency exports measured in \$'s using a shadow TR/\$ rate.

Then the following measures of the country's ability to pay are possible:

$$A^c = D^c/F^c$$

$$A^n = D^n/F^n$$

$$A^t = (D^c + D^n)/(F^c + F^n)$$

4.23 Let us assume for simplicity that D^n is relatively small and that the concern is with a country's ability to pay D^c . The important question to ask, then, is whether one should attach greater weight to A^c or A^t in analyzing a country's situation - whether non-convertible currency exports should be considered as an element in measuring a country's ability to pay \$ debts. Thus, one should examine whether CMEA trade flows can help ameliorate the adjustments required to pay D^c . In such an examination, it is useful to consider two alternative, polar, scenarios that a CMEA country could possibly face:

- (i) Identical goods are exported to the CMEA and the West. Imports from

both regions are perfect substitutes in consumption. Under such a scenario, consider two possible methods of debt repayment - reducing imports from the West or reorienting exports to the West and balancing TR trade by reducing imports from the CMEA. Given the assumed degree of substitutability within the economy, either method is possible. Yet, in one case, trade within the CMEA plays an important role in the adjustment process. To use A^C would be to ignore important features of the country's trade position. A^t would be the better measure of the country's ability to pay under this first scenario.

- (ii) In the second scenario, assume that intra-CMEA exports cannot be shifted to the West and that convertible-currency imports perform a crucial function in the economy, one that cannot be fulfilled by either imports from the CMEA or domestic production. Thus, there is no substitution in trade between the two regions. The debt can only be repaid by increasing the production of goods presently exported to the West or by reducing imports from the West. CMEA trade is irrelevant to the adjustments that must be made to pay the debt. Under this scenario, one can ignore CMEA trade when evaluating the debt burden: A^C is the correct measure to use.

4.24 Comparison of the two scenarios clearly identifies the central question to be asked when examining whether TR trade should be an element in evaluating the burden of \$ debt. One must decide whether CMEA trade and \$ trade are substitutes. One must ascertain the degree of substitution in domestic uses of imports from the two regions and investigate to what extent domestic enterprises can switch between producing TR and \$ exports. In such

an investigation, one should remember that, at the margin, substitution may be very easy, but will become more difficult as greater adjustments are required. If perfect substitution is possible, A^t is the correct measure of ability to pay convertible currency debts. If substitution is impossible, then A^c should be used. Obviously then, in the intermediate case, the weights to be attached to A^c and A^t depend upon the extent to which intra-CMEA trade and multilateral trade are substitutes.

4.25 The foregoing discussion shows that one should be very wary of any analyses that assume that convertible-currency trade is naturally more important than transferable-ruble trade. Such analyses, by focusing on \$ debt and the importance of importing Western intermediate goods, implicitly assume that substitution is not possible between the two types of trade. In making such an assumption, one may misunderstand events when substitution does occur. For example, if a country redirects exports from the CMEA to the West, the debt-service ratio measured in convertible currency (A^c) will fall. However, since total trade volume and the size of debt-service are unchanged, the fundamental liquidity position of the country (A^t) remains the same. The gain in A^c is purely spurious.

IV(e). The Importance of the Distinction
Between Hard and Soft Goods

4.26 The above analysis clearly shows that the distinction between hard and soft goods is crucial in evaluating policy and performance in CMEA countries. Hence, it is important in any practical policy exercise to be able to make that distinction on a rigorous basis. For example, if goods are incorrectly classified, a highly misleading view of past trade performance will be obtained from trade statistics. There seems to be no general

agreement on how one might define the distinction between hard and soft goods. The present paper cannot hope to resolve the disagreements, but it is useful to review some of the alternative definitions that have been used in the past. The three definitions that seem to be most common are as follows:

- (i) Hard goods are often defined as those goods whose relative prices within the CMEA are below world-market relative prices. This definition would place the focus of future research on the reasons why CMEA relative prices are different from those on world markets. Several alternative explanations are already at hand: the CMEA is a customs union with a comparative advantage in the production of raw materials; the bloc policies of the USSR require that it subsidize its exports; CMEA price rules can be more easily manipulated by the producers of manufactured goods than by producers of raw materials.
- (ii) Alternatively, one could view hard goods as those in excess demand in the CMEA, given present pricing rules. Similarly, soft goods are in excess supply. Obviously, in any particular equilibrium, this definition is consistent with (i). But (i) and (ii) could have different consequences for a country trying to improve its export performance in the CMEA by establishing the 'hardness' of some of its goods. Definition (i) suggests that hardness can be established by recourse to studies of relative prices. The outcome under definition (ii) would depend more on the bargaining power of a country's trading partners.
- (iii) Within Eastern Europe, soft goods are often defined as those that cannot be sold in the West due to their poor quality. This

definition lacks rigor because it does not take into account the trade-off between price and quality. Perhaps, rigor could be attained by specifying that goods are not presently sold at a price less than the cost of production. Then, there may be some consistency between all three definitions, when applied to a particular trading equilibrium. However, if (iii) is used by a country's trading partners, there may be totally different consequences for commercial policy than if (i) or (ii) is used. For example, it may be in the interests of a country to subsidize exports to the West in order to benefit from having more of its goods classified as hard.

4.27 Consideration of the definition of hard and soft is an important ingredient in understanding the policy of CMEA countries because there may be a large payoff from being able to get a soft export reclassified as hard. The following result establishes the size of this payoff:

PROPOSITION 6: If a soft good is reclassified as hard and its TR price in CMEA trade does not change, the real value of export earnings from that good is increased by the following percentage amount:

$$\left(\frac{C_{nj}^x}{C_{sj}^x} - 1 \right) \times 100.$$

Using data given in Marrese and Vanous (1983 p. 182), one can estimate that Hungary would increase by 70% its real earnings on the exportation of a good to the Soviet Union if the good was reclassified from soft to hard. ^{28/} The importance of analyzing ways in which goods can be reclassified is, therefore, transparent.

4.28 The foregoing remarks have been made solely with one purpose in mind. They aim to convince the reader that careful analysis of the trade

policy of CMEA countries requires extended reflection on the distinction between hard and soft goods. Future research must examine three important questions: How can this distinction be defined rigorously? How can one introduce this distinction into the statistical analysis of trade flows? In what ways can countries attempt to change the classification of particular goods?

IV(f) Valuing TR's Used in Interactions with the USSR

4.29 The comparative advantage of the USSR lies overwhelmingly in raw materials, which are primarily hard goods. If the Soviet Union insisted on the separate balancing of hard and soft goods, trade flows between the USSR and Eastern Europe would be exceedingly small. Given that the USSR wants to conduct active trade relations with the rest of the CMEA, it has no choice but to accept some soft goods in exchange for its hard exports. But if the Eastern European countries could freely obtain hard goods for soft, they would maximize their welfare by buying large amounts of raw materials from the USSR and reexporting them to the West. This policy would be successful because of the relative cheapness of raw materials in intra-CMEA trade. In order to stop such policies being implemented, the Soviet Union places constraints on the amount of hard goods that it is willing to sell at CMEA prices. Thus, while the distinction between hard and soft goods is important when analyzing Eastern European trade with the Soviet Union, one cannot assume that hard and soft trade are balanced separately. Instead, one must analyze the effect of the constraints placed by the USSR on hard-goods trade.

4.30 Apart from noting that hard goods and soft goods are not balanced separately and that the small CMEA countries cannot exchange their soft goods

for Soviet hard goods in unlimited quantities at CMEA prices, little can be said about the exact nature of Soviet trade constraints. Yet, being able to express these constraints is necessary in the process of valuing trade flows and debts. In the ensuing pages, elementary propositions are presented on the way in which different types of constraints affect the valuation of a TR. The most important lesson from these propositions is that investigation of the nature of Soviet trade constraints is crucial if one hopes to obtain better estimates of the real value of TR trade flows.

4.31 The analysis of the present section differs in a crucial way from that in IV(c). When examining trade between small CMEA countries, trade balances for hard and soft goods were completely separate. In trade with the Soviet Union, balances for the two types of goods are linked. If both types were included in a single trade balance and there were no further constraints on trade, then one would have (here, a "u" as the second subscript will indicate trade with the USSR):

$$C_{hu}^X = C_{su}^X = C_{hu}^M = C_{su}^M$$

In such a case, any of these four conversion factors could be used to value TR trade in dollar terms. But one knows that constraints must have been imposed. The present section proceeds, therefore, by examining the effects of different types of constraints on the choice of conversion factors.

4.32 The simplest restriction that the Soviet Union could impose is a quantity limit. To see why such a limit will affect valuation, consider the case of a Soviet quantity ceiling on oil exports to a small CMEA country. The oil will be obtained at beneficial terms of trade, given the CMEA relative prices of hard and soft goods. However, using these prices to calculate the value of the TR would be misleading. The marginal value of an extra TR is

much less than that calculated using oil prices because the relatively cheap good, oil, cannot be bought with an extra TR.

4.33 If the Soviet Union imposes quantity restrictions, then they will either be on the USSR's export of hard goods or on its import of soft goods. The following propositions show the effects of such restrictions on the method of valuing the TR applicable to a small CMEA country.

PROPOSITION 7: If the country's hard good imports from the Soviet Union are subject to a quantity constraint, the use of C_{hu}^M will lead to overvaluation when TR's are converted into dollars.

PROPOSITION 8: If soft good exports to the Soviet Union are subject to a quantity constraint, the use of C_{su}^X will lead to undervaluation when TR's are converted into dollars.

These two propositions together imply that greater reliance should be placed on using C_{su}^M and C_{hu}^X when valuing trade flows, if Soviet constraints take the form of quantity restrictions.

4.34 The above formulation of Soviet constraints is, perhaps, unrealistic. It does not take into account the fact that bargains can be struck on the composition of exports. For example, it seems likely that the Soviet Union would be willing to sell larger amounts of natural resources in the CMEA, if Eastern European countries paid for them with a higher share of hard goods than is traditional. One could then imagine characterizing the trade constraint as one in which Eastern European countries had to pay for additional hard good imports with a specific combination of hard and soft exports.

4.35 A plethora of different formulations of the constraints is possible. Here, one example is taken to show the consequences on the valuation of trade. There is no sense in which this example is to be

justified as more plausible than many others. Further research is needed to investigate the formulation of Soviet trade constraints.

4.36 Let us suppose that the Soviet Union insists that the proportion of hard goods in its incremental imports from Eastern Europe must be at least b. In its incremental exports, the Soviet Union insists on a proportion e of soft goods. Then, the following result shows how to value trade flows:

PROPOSITION 9: If $0 < b < 1$ is the marginal proportion of hard goods in exports and $0 < e < 1$ is the marginal proportion of soft good imports in a small CMEA country's trade with the Soviet Union, then:

$$bC_{hu}^X + (1-b)C_{su}^X = eC_{su}^M + (1-e)C_{hu}^M$$

and the \$ value of marginal TR trade flows is found by multiplying TR values by one of the terms in the above formula.

Proposition 9 shows the way in which increments in balanced trade flows should be revalued, given a specific formulation of the constraints on trade placed by the Soviet Union. The above formula could therefore be used to construct measures of aggregate trade flows when, for example, examining the future possibilities facing the economy.

4.37 The above formula is not applicable either for valuing TR debt or when valuing trade in specific commodities. One cannot use Proposition 9 to revalue debt because the commodity composition of the goods used to pay the debt may be different from that in incremental balanced trade flows. Thus, in valuation of debt, Proposition 5 becomes relevant. For valuing trade in a single commodity, one requires a TR/\$ conversion ratio that reflects the value of a particular good. Proposition 2 then provides the appropriate formula.

4.38 There is a simple connection between the various formulae for valuing the TR. Proposition 2 provides the formula for valuing the trade flow

of specific commodities. When one requires valuation of aggregates of these commodities, as in converting debts and total trade flows into \$'s, one needs an exchange rate that is a weighted average of the exchange rates for individual commodities. Propositions 5 and 9 show which weights to use.

4.39 In conclusion, the above discussion should not be seen as providing the answer on how to value trade between small CMEA countries and the USSR. It suggests, rather, one plausible answer, based on a particular assumption about how the Soviet Union views the inter-relationship between hard and soft good trade. The way in which the TR is valued would change with a different formulation of that assumption. Hence, it is important to emphasize here that future research should investigate the way in which the Soviet Union views trade with Eastern Europe.

V. Valuing Trade Flows and Debts: What is Possible

V(a). Introduction

5.1 Two basic premises underlie the discussion in the present section. The first is that policy analysis can only be as good as the data that underpins it. Thus, improvements in the informational content of data can directly lead to better judgements. The second premise is that a series of marginal adjustments in existing statistics can produce a significant improvement in overall quality of information. When one has to rely on statistical sources that have systematic biases, one may be able to use outside information - for example, the results of previous research - in order to lessen these biases. ^{29/} Failing the existence of unbiased raw data, such an approach may be the only way in which one can attempt to produce information that meets the requirements of a particular policy analysis.

5.2 The present discussion examines ways in which one can improve the quality of information on trade flows and debt in CMEA countries. The correction of biases in official statistics can aid policy analysis by producing more accurate data in the following areas:

- (i) the total trade conducted by an economy and its change over time,
- (ii) the geographical structure of trade, in particular the division between socialist and non-socialist countries,
- (iii) the commodity structure of trade,
- (iv) the valuation of the debt burden, in particular in relation to a country's ability to pay.

Implicit in the calculation of each of these measures is the construction of meaningful exchange rates between the TR and the \$, perhaps differentiated by partner country and by commodity.

5.3 The reconstruction of trade and debt data can be accomplished at a variety of levels of sophistication. Two options particularly suggest themselves. One could follow the lead of Marrese and Vanous (1983, 1984) and use unit value calculations to price disaggregated TR trade flows in dollar terms. The disadvantage of this more sophisticated approach is the extensive amount of data processing that it requires. Alternatively, one could rely on an ad hoc approach, appropriately combining information on published exchange rates and price indices, and the results from previous research on the structure of CMEA relative prices. Since an important ingredient of the ad hoc approach is the use of information from the previous work of Marrese and Vanous, it would still be necessary to understand their methodology even if one were to make a decision, on practical grounds, not to pursue the more sophisticated approach. Thus, in section V(c), that methodology is briefly

discussed. The ad hoc approach is reviewed in V(d); the data needed to revalue trade flows and debts are listed in V(b). Finally, an illustrative application of the methods is presented in Section V(e).

V(b). The Information Available or Required

5.4 Trade Flows within Major Commodity Categories. It is assumed that the exercise of reconstructing trade statistics begins with two sets of trade data. ^{30/} One set is denominated in dollars, the other in TR's. Both sets are disaggregated by country (or region) and by commodity. Here, it is assumed that the requirement for policy analysis is a commodity breakdown into a limited number of major groups (for example, the ten groups of the 1-digit Standard International Trade Classification.)

5.5 Some countries publish trade statistics denominated in domestic currency rather than \$'s or TR's. If this is the case, the analysis would begin by establishing which exchange rates were used to translate international values into domestic values. Hence, one effectively derives the original information (in TR's and \$'s) that generated the published statistics. This beginning step is necessary because, in all likelihood, the exchange rates used to obtain domestic values will have been arbitrary official ones. It is precisely the use of such arbitrary rates that the present study advises against. Thus, one of the most important, but simplest, recommendations of this study is that when statistics are presented in a currency different from the one used in a transaction, information should be given about the currency denomination of the primary data and the exchange rate used. ^{31/}

5.6 Debt. Data are usually available on debt denominated in both TR's

and \$'s. ^{32/} Obviously, full analysis of a country's balance-of-payments policies requires knowledge of interest rates and maturity structure. In the case of TR debt, it is also of extreme importance to know what proportion of the debt must be paid in hard goods. However, one cannot be sanguine about the possibility of obtaining such information.

5.7 Exchange Rates. Surprisingly perhaps, given the discussion of previous sections, some published exchange rates may contain useful information. To explain this point, it is helpful to discuss some history of the exchange rate policy of CMEA countries (see van Brabant (1977, 1985), and Vanous (1984)). The official TR/\$ exchange rate is set by the organs of the CMEA. The TR to domestic currency rates (henceforth denoted TR/D) and the \$ to domestic currency rates (\$/D) are, of course, set by individual countries. For many years, the TR/D and \$/D rates were set so that their cross rate was consistent with the official TR/\$ value. But because the TR is overvalued relative to the \$, the official TR/D rates were rarely used as instruments of domestic economic management. Since the mid-1950's, policy-makers have used "internal exchange rates" to convert valuta or deviza prices (prices in domestic currency units obtained using official exchange rates) into domestic wholesale prices. The internal rates were often good-specific. The official rate multiplied by the internal exchange rate would then approximate (very roughly) a realistic TR/D valuation.

5.8 Once the arbitrariness of the official TR/\$ value is acknowledged, a natural progression is to employ TR/D and \$/D rates whose cross-product approximates a realistic TR/\$ value. Some countries have, therefore, begun using "commercial exchange rates" with such a property. Hungary, from 1976, Romania (1981), and Poland (1982) all use such rates. Since the TR/\$ cross-

commercial exchange rates are, at least in theory, supposed to represent real economic magnitudes, it is important to consider how the TR/D and \$/D rates are set.

5.9 The underlying basis of the calculation of the commercial exchange rates (CER's) is that they should be equal to the domestic cost of obtaining a unit of foreign currency. ^{33/} In theory at least, the CER's correspond to some of the statistical entities developed in section IV. The \$/D rate is equal to $E_{w\x . The TR/D rate is a weighted sum of E_{sj}^x and E_{hj}^x , where the weights are equal to the proportions of hard and soft goods in trade and the "j" subscript now refers to the whole of the CMEA.

5.10 The CER's might be useful in judging the true value of trade flows and debts. But due caution must be exercised when using these exchange rates. One should keep in mind the following points:

- (i) Although the methodology underlying the formulation of the rates is clear, final determination occurs as the result of a political process. Hence, the announced CER may differ from that indicated by economic calculations, as seems to have been the case in Poland (van Brabant 1985 p. 28).
- (ii) Planners have resisted applying rates based on marginal cost considerations. Rather, average costs have been employed in Hungary (Marer 1981), while in Poland a compromise between average and marginal costs seems to be in effect (Michalski 1985).
- (iii) The rates are not changed as frequently as would seem to be prudent, based on relative movements of internal and external prices. This seems especially the case for the TR/D rates. For example, Hungary's rate has remained constant since 1981. Thus, if one uses

a CER, one must be careful to make adjustments for relative price movements when the domestic authorities have kept the CER constant for a number of years. Therefore, one should ascertain the date at which the original calculations underlying the CER's were carried out and what considerations affect changes in those rates. ^{34/}

5.11 Price Levels of Traded Goods. Construction of the conversion measures introduced in section IV requires that some information be obtained on prices in world markets relative to those in the CMEA. The only way in which such information can be obtained (apart from that implicit in the commercial exchange rates) is by constructing unit value indices from disaggregated trade data. This is the approach of Marrese and Vanous (1983, 1984).

5.12 The present study is not the place to inventory the available information on trade prices. Here, it is solely necessary to point out the existence of data that can be used to estimate relative CMEA-world prices and to list the following problems in using that data:

- (i) The data are not sufficiently disaggregated to construct true price indices. Only unit value indices can be obtained.
- (ii) Data for some commodity categories are available only for a limited number of countries. Marrese and Vanous (1984), for example, assume that Polish and Hungarian prices are representative of those in the CMEA as a whole.
- (iii) Somewhat arbitrary assumptions must be made on the difference in quality between products sold by different CMEA countries.
- (iv) Obtaining the relevant price indices is a time-consuming process. Usually, therefore, it will be prudent to rely on the results of

existing studies, the most complete of which are those by Marrese and Vanous (1983, 1984).

5.13 Indices of Trade Prices. Given a set of estimated TR/\$ conversion rates for one year, one may be able to update these rates by using indices of trade prices. These indices would only be helpful if they separately show the movement of TR and \$ prices in different commodity categories. At present, only Hungary publishes such information (Vanous 1981 p. 698).

5.14 Domestic Prices. The formulae for TR/\$ conversion factors given in section IV require information on the domestic prices of goods imported from the CMEA and, separately, of imports from convertible currency areas. It is extremely unlikely that such information will ever be available in a direct form. In the face of such difficulties, one can proceed in two ways - either make assumptions that obviate the need for internal price data or obtain the data indirectly.

5.15 Marrese and Vanous (1983, 1984) implicitly assume that one can view quality-adjusted intra-CMEA traded goods as identical to those traded between the CMEA and the West. Then the denominators of E_{gj}^x ($g = h$ or s) and $E_{w\x are identical. (Here, and in the following step, one uses point (i) of Section IV(c) - the weights on prices in the formulae for the E's can be somewhat arbitrary.) Since $C_{gj}^x = E_{w\$}^x / E_{gj}^x$, one can write (for $g = h$ or s):

$$C_{gj}^x = \frac{\sum_i P_{w\$i} X_{gji}}{\sum_i P_{gji} X_{gji}}$$

= exports of type g to country j valued at world market \$ prices
exports of type g to country j valued at intra-CMEA TR prices.

The intuition behind such a representation of the C's is obvious - revalue intra-CMEA-trade at world market prices in order to find its true value. (Of

course, an analogous interpretation of C_{gj}^M holds.) But that intuition should not lead one to gloss over the strength of the assumption that one can compare goods traded within the CMEA and goods traded on world markets.

5.16 An alternative way to find information about domestic price levels is to rely on commercial exchange rates (CER's). As previously discussed, in principle the Polish and Hungarian CER's were found by comparing the value of exports in foreign currency to that in domestic currency. Therefore, the relevant information on domestic prices is embodied in those CERs. If one chooses to use such information, however, one would need to be sure that necessary adjustments had been made to take into account both the biases in the setting of the CER and the price movements occurring after the CER's value had been fixed. Also, the CER's could only be used to value total trade flows. Trade within different commodity groups must be revalued at different TR/\$ rates.

V(c). Reconstructing Trade Statistics:
A Sophisticated Procedure

5.17 The most sophisticated attempts to construct economically meaningful intra-CMEA trade statistics denominated in dollars are the studies of Marrese and Vanous (1983, 1984). One option in revaluing trade flows is to follow their methodology. Even if one were to decide to use the much simpler procedure outlined in section V(d), one would need to use some of the results of Marrese and Vanous. Thus, whether or not the sophisticated procedure is to be employed, it is necessary to familiarize oneself with their methodology.

5.18 Marrese and Vanous (1984) proceed in the following steps:

- (i) Ruble trade flows within major commodity categories are found. As much as is possible, the categories should be such that they contain

either all hard goods or all soft goods.

(ii) Within each commodity category, the unit value of goods in East-West trade, measured in \$'s, and TR unit values of goods in intra-CMEA trade are found. The unit values are constructed using information on disaggregated trade flows within the major commodity categories. Because limited amounts of data are available from Eastern Europe, for some commodity groups data for Hungary and Poland is taken to apply to all the CMEA. 35/

(iii) Next, assumptions are made concerning the extent to which the quality of Hungarian and Polish goods differs from that of goods produced in the rest of the CMEA. Quality adjustments are then estimated for countries other than Poland and Hungary, in order to construct estimates of the TR and \$ prices of comparable goods traded by these countries. Because of the difficulty of estimating relative quality, this step of the Marrese-Vanous procedure is the one most susceptible to objection.

(iv) Given an index of TR prices of goods in a specific commodity category and a corresponding \$ price index, one can construct a TR/\$ exchange rate specific to that category. Marrese and Vanous construct 72 TR/\$ exchange rates ($72 = 6 \times 6 \times 2$; 6 = number of commodity categories; 6 = number of trading partners with Soviet Union; 2 = exports, imports). 36/ The fact that there is great variation among these exchange rates is consistent with the discussions of the effects of bilateralism in sections III and IV.

5.19 The Marrese-Vanous valuation procedure does not reflect the effect of constraints on trade imposed by the Soviet Union,. Further deliberation

would be needed to specify the nature of those constraints (see Propositions 6-9 of section IV). Also, without further information, those exchange rates could not be used to value debt owed within the CMEA. One would need to know the mix of goods that must be provided to pay the debt. Of course, arbitrary assumptions could be made about this mix - for example, a normal bundle of exports would be provided. But one should remember the essential arbitrariness of such an assumption and, therefore, the possible errors in the estimated \$ value of total debt.

V(d). Updating Information on TR/\$ Exchange Rates:
An Ad Hoc Procedure

5.20 The disadvantage of the Marrese-Vanous method, as described above, is that it requires the reconstruction of data on relative unit values in every time period. Such a process is time consuming and relies on a variety of data sources, some of which may have long publication lags. Therefore, a quicker method of updating information is required, if policy analysis is to be timely. In this section, such a method is outlined. 37/

5.21 The ad hoc procedure consists of the following steps:

(i) For some base year, use the data on exchange rates from a study employing the sophisticated procedure of section V(c). For example, one could use the Marrese-Vanous (1984) estimates for 1982, the last year in which these authors calculated relative TR/\$ unit values for all commodity groups.

(ii) As discussed in section V(b), one can view the conversion factors C_{gj}^x and C_{gj}^M as ratios of TR trade prices to \$ trade prices. To update the C's, one can use data on indices of trade prices.

Fortunately, Hungary publishes such indices, disaggregated by

commodity and region. ^{38/} The TR/\$ good-specific exchange rates, then, can be updated using the Hungarian data. To apply these rates to the remainder of the CMEA, one would need to assume that Hungarian trade price movements are representative of the region as a whole. If such an assumption is invalid, there is little that one can do for countries other than Hungary, apart from applying the procedure described in V(c). ^{39/}

5.22 At this juncture, it is perhaps fitting to comment that the results of Marrese and Vanous are not unanimously accepted by Western scholars. In such an area, where data are so incomplete, it is unlikely that any results could be obtained without making assumptions that some critic finds unacceptable. Nevertheless, the work of Marrese and Vanous is easily the most comprehensive and careful study of TR/\$ comparisons that has yet been undertaken. If one were unwilling to accept their estimates, the only alternative would be to conduct one's own study, beginning with the raw data published by CMEA countries.

V(e). Some Illustrative Calculations

5.23 The purpose of the present section is to justify that it is essential to apply the methods of either section V(c) or V(d), when examining Eastern European trade flows. The justification is made by presenting examples in which dramatic differences in conclusions result when TR trade flows are revalued using an exchange rate approximating a shadow rate. The examples show that correct valuation of the TR can reverse conclusions made concerning a geographical reorientation of trade (an apparent turn towards the CMEA was not real), a change in trade levels (a significant fall in exports

was disguised), and the relative importance of a particular sector (a loss in market share was hidden).

5.24 The calculations presented here are for illustrative purposes only. The intention has not been to derive a new set of data by using the best methods. Rather, the goal is to show that information is easily available that allows one to remove the worst biases from existing data. Thus, the calculations were made using only World Bank data and information contained in easily available English language publications. The examples, therefore, show what can be accomplished with minimal effort.

5.25 The exercise examines the performance of the Romanian export sector between 1980 and 1984. Romania publishes foreign trade data denominated in both \$'s and in domestic currency. The TR/\$ cross exchange rates implicit in each set of data are different and both differ from the best estimates of shadow TR/\$ rates. ^{40/} Therefore, neither set of data truly represents real trade flows and one can use either set to construct better estimates of those flows. The present exercise focus on the \$ export data contained in Tables 3.5, 3.9 and 3.10 of the statistical appendix of the World Bank's Romanian Economic Memorandum (1985).

5.26 Two central inaccuracies are embodied in the data. First, the TR is overvalued: a rate of \$1.49 to the TR is used, whereas estimates obtained from commercial exchange rates and the work of Maresse-Vanous show the TR equal to \$1 or below during the 1980's. Second, the price of manufactured goods relative to that of raw materials is much higher in CMEA trade than in the West. Adjustments in trade figures must take into account both of these factors.

5.27 The method used to revalue Romanian exports is essentially that

described in V(d). The updating of the estimated TR/\$ conversion ratios, using Hungarian trade price indices, has fortunately been carried out in earlier studies. The relevant data are contained in Marrese-Vanous (1984) and Vanous (1984). ^{41/} The studies give estimates of C_{gj}^x , where the subscript g varies over 6 commodity categories and country j is the Soviet Union. Exchange rates for Romanian trade with the USSR are, thus, assumed to apply to Romanian trade with the whole of the CMEA. No doubt such an assumption produces inaccuracies in estimates, but it is essential given the absence of studies on non-Soviet intra-CMEA trade. ^{42/}

5.28 The first set of data, presented in the first four lines of Table I, examines the growth of the \$ value of exports. The recalculated data are found by revaluing Romanian-CMEA trade at a more realistic TR/\$ rate. ^{43/} That revaluation immediately reduces the absolute size of dollar export figures by between 15% and 30%. But, more significantly, there is a change in one's perception of export performance. The official data show a significant decline in the value of exports in only one year and a growth of 12% over the four years. The recalculated figures show declines in two years and a fall of 4.5% during 1980 to 1984.

5.29 The reason why official and recalculated data give such different impressions of export performance is that, according to the official figures, there was a reorientation of trade towards the CMEA. The relevant data are given on line (5) of the table. Those data do not take into account the overvaluation of the TR nor the fact that the TR was depreciating against the dollar during the 1980's. Once one realistically values trade, not only does the picture on the total volume of trade change, but also the apparent reorientation vanishes. Comparing lines (5) and (6), one can see that the

shift of 6% of trade towards the CMEA is actually a spurious result. If anything, during 1980 to 1984 trade shifted further away from the CMEA. The differences in conclusions derived from lines (5) and (6) show the problems that result if relative movements in TR and \$ trade prices are ignored.

5.30 Given the problems that occur in statistics of total trade, it is instructive to consider the export performance of sub-sectors of the economy. In policy analysis, the examination of particular sectors allows one to make conclusions about the success of programs to improve the export competitiveness of an economy. Given the emphasis contained in Romania's policies in the 1970's, study of the performance of the machinery sector is highly informative. Furthermore, given that machinery is the good most overvalued in CMEA trade, it is likely that official statistics on this sector could be highly misleading.

5.31 The relevant data on the machinery sector are contained in (7)-(12) of Table I. To emphasize the difficulties of using official figures let us concentrate on the period 1981 to 1984. During that time, official data show machinery exports growing by 11% and becoming relatively more important in Romania's trade. The recalculated figures show a dramatically different picture: machinery exports declined in value in all three years from 1981 to 1984 and fell as a share of total exports. One need not emphasize the different policy judgements that would arise when using the two different sets of data.

V(f). Conclusions

5.32 The purpose of the present section has been to argue that the revaluation of CMEA international transactions is necessary and that methods

are available for such revaluation. The availability of data has also been reviewed and, implicitly by omission, areas where data are lacking have been revealed. As a consequence of the missing information, part of the discussion of section IV had to be ignored in the preceding paragraphs, in particular Proposition 5 on the valuation of debt and Propositions 7-9 on the valuation of trade with the Soviet Union. The reason why those propositions could not be applied is simple. Information on Soviet constraints on trade and on the terms of loan agreements are unavailable. Future analysis would be greatly improved if such data could be obtained.

5.33 The methods described above should not be regarded as producing exact estimates. Precise figures cannot be constructed using presently available data: too many factors have to be ignored (e.g., differences in TR prices in trade with different countries) and too many assumptions must be made (e.g., Soviet import data are representative of CMEA trade). The methods should be viewed as reducing the size of biases present in official data. Given that limited view of the objective, it is unlikely that any knowledgeable analyst would object to the application of the methods.

5.34 The conclusion here is, therefore, that estimates should be obtained using the methods of either V(c) or V(d). (The choice between the two methods will primarily depend upon the analyst's view of the trade-off between accuracy and cost.) At a minimum, the recalculations should be placed alongside the original official data in order that the biases in official statistics become transparent. Where large differences occur in conclusions derived from the two sets of data, the policy analyst should be wary of using the official figures.

Table 1: SOME ILLUSTRATIVE RECALCULATIONS OF
ROMANIAN TRADE STATISTICS

Value data are in millions of current U.S. dollars

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
(1) Value of exports, official data	11209	12610	11559	11512	12646
(2) Value of exports, recalculated	9737	10543	9211	8767	9306
(3) % growth of exports, official data		12.0	-8.4	0.0	8.8
(4) % growth of exports, recalculated		8.2	-12.6	-5.0	6.1
(5) % share of non-socialist countries in exports, official data	56.5	56.4	52.0	50.7	50.2
(6) % share of non-socialist countries in exports, recalculated	65.1	67.5	65.2	66.5	68.0
(7) Value of Machinery and Equipment Exports, official	2791	3657	3822	3649	4047
(8) Value of Machinery and Equipment Exports, recalculated	1866	2578	2521	2207	2143
(9) % growth of Machinery and Equipment Exports, official		31.0	4.5	-4.5	10.9
(10) % growth of Machinery and equipment Exports, recalculated		38.0	-2.2	-12.5	-2.9
(11) Machinery Exports as a percentage of total exports, official	24.9	29.0	33.1	31.7	32.0
(12) Machinery Exports as a percentage of total exports, recalculated	19.2	24.5	27.4	25.2	23.0

Sources: Official data - World Bank (1985)
Recalculations - see text

Appendix A:

THE RELEVANCE OF THE ABOVE ARGUMENTS FOR COUNTERTRADE

In its essence, countertrade is a bilaterally-balanced exchange of goods between institutions (firms or governments) in two countries. Therefore, important parts of this paper's discussion are relevant to countertrade. The discussion comprises both negative and positive results. The former (see especially Section III) show the mistakes that can be made if bilateralism is ignored. The latter show how one can correct these mistakes in the particular case of CMEA trade. Therefore, unfortunately, it is mainly the negative results that apply to countertrade. The positive results, developed with CMEA institutional characteristics and data availability in mind, cannot be translated to the case of countertrade, without large changes.

The main conclusions relevant to countertrade are those which show that the absolute levels of prices in bilaterally-balanced trade flows need not conform to those existing in multilateral trade. Therefore, although countertrade contracts often use \$ values, those values might bear no relation to \$'s used in multilateral transactions. Since no convertible currency changes hands as a result of the exchange, the participants in the arrangement need not concern themselves with the absolute money values in the contract. The dollar data of countertrade flows and those in multilateral trade are not necessarily comparable.

One is naturally led to ask whether there are reasons why countertrade \$ values may be systematically distorted. Unfortunately, there is little systematic theory explaining the reasons for countertrade. Failing such a theory, one cannot develop a cohesive argument on price distortions.

Nevertheless, some suggestive arguments can be made, based on specific examples. These arguments serve mainly to alert the reader to the possibility that there are reasons why the price levels in countertrade contracts might be different from those on world markets:

- (i) Countertrade often occurs when a firm in a developed country (firm A) arranges credit for a firm (B) in a country in which credit is harder to obtain. A absorbs the credit risk and possibly some of the borrowing cost. However, the prices implicit in the countertrade contract then reflect A's extra cost. Either A receives a higher price than normal or B a lower one. In either case, data on merchandise trade flows is distorted. Take, for example, the case when A's selling price is higher. Then, part of B's expenditure on imported goods is actually a payment for financial services. The merchandise imports of B's country will appear larger than is actually the case.
- (ii) As is well known, a cartel member usually has an incentive to break cartel agreements if fellow members cannot find out. Countertrade can provide a means of hiding the true price of a transaction. Let us consider an example - the recent agreement between Britain and Saudi Arabia exchanging weapons for oil. Now Britain, in recent years, has not evidenced a noticeable need to import oil. In all probability, British arms manufacturers will sell the oil on spot markets at a price below the one specified in their contract, the prevailing OPEC price. Presumably, their expected losses on the oil are compensated by receiving higher than normal prices for their exports. In such a case, the dollar values specified in the

countertrade contract are inflated relative to world market prices.

(iii) A firm might forego an opportunity to engage in price discrimination, if it believes that its regular customers will find out and demand equivalent price reductions (Riley and Zeckhauser 1983). However, if those reductions can be hidden, price discrimination might be undertaken. Countertrade is a means by which two price discriminating firms can hide their true selling prices (Magenheim and Murrell 1985). Just as in the previous example, the dollar values specified in the contract will be higher than the firms' true marginal willingness to pay. Thus, the \$ value of the contract overstates its real value. Given that the incentive to price discriminate increases in recessions (marginal costs are lower when there is spare capacity), valuing countertrade at contractual values may lead to underestimates of the extent to which the value of world trade and prices decline during recessions.

The aim of the foregoing discussion has not been to provide any answers on how to value countertrade. Such answers require more theory and more data than presently exists. The aim, rather, has been to alert the reader to a potential problem in the interpretation of countertrade data. There are important reasons why prices in countertrade contracts will differ from world market prices. Hence, when statistics assume that countertrade \$'s are real \$'s, an important part of reality may be hidden.

Appendix B:

A CHECKLIST OF THE INFORMATION NEEDED TO EVALUATE FOREIGN
TRADE STATISTICS AND POLICY IN THE CMEA COUNTRIES

The analysis developed in the paper has revealed many areas in which important information on the CMEA countries is lacking. Obtaining this information is a necessary prerequisite for improving the policy analysis of Eastern European economies. Since the text does not always explicitly identify the areas in which further facts or data are needed, it is useful to construct a checklist indicating where those areas are. Answers to the following questions would enormously improve the analyst's ability to understand both the present economic situation in the CMEA countries and the possibilities for policy improvements.

- I. Information useful in understanding the meaning and significance of foreign trade statistics.
 - (a) When statistics of trade flows are denominated in a currency other than the one used in the transaction, what exchange rate was used to derive the statistics?
 - (b) Does any information exist that would allow one to compare the \$, TR, and domestic prices of goods that are traded both in the CMEA and the West?
 - (c) What proportion of \$-denominated intra-CMEA trade is truly multilateral, rather than bilaterally balanced?
 - (d) Where does the \$-denominated bilaterally-balanced intra-CMEA trade appear in foreign trade statistics?

II. Also helpful in interpreting trade statistics would be information on the underlying basis of the distinction between hard and soft goods.

- (a) To what extent can one truly speak of two distinct categories of goods, hard and soft, rather than a continuum?
- (b) Which goods are classified as hard?
- (c) What factors determine whether a good is viewed as hard?
- (d) How is the classification into hard and soft applied in negotiations with other countries?
- (e) Does the hard-soft classification vary between partner countries?

III. Questions directed at an analysis of the real burden of debt.

- (a) What interest rates are charged on TR debt?
- (b) What is the maturity of the TR debt?
- (c) What proportion of the TR debt is a result of "swing credits" extended during the normal operations of intra-CMEA trade?
- (d) Are the interest rates on such swing credits low compared to the rates on \$ loans or loans extended under special circumstances by the USSR.
- (e) What stipulations exist on the types of goods that must be used to repay TR debt?
- (f) To what extent are trade within the CMEA and multilateral trade substitutes? What proportion of exports to the CMEA could easily be shifted to Western markets? To what degree can imports from the CMEA substitute for imports from the West in domestic use?

IV. On commercial exchange rates (CER's):

- (a) What is the methodology employed in the calculation of the CER?
When was the calculation carried out?

- (b) Was the CER set purely on the basis of a strict application of a set of economic principles or did political considerations enter into the final determination of the rate?
- (c) How are the CER's updated? When were they last updated?
- (d) What criteria are used to decide when to change the value of the CER?
- (e) Are the CER's used to guide internal decisions? Are domestic prices of foreign goods equal to the foreign price multiplied by the CER? To what extent are special subsidies and taxes applied to enterprises that engage in foreign trade activities?

V. Questions directed at the improvement of commercial policy.

- (a) What constraints does the Soviet Union place on the size of trade flows that take place at CMEA prices?
- (b) Given that intra-CMEA and \$ relative prices are different, what domestic programs exist to equalize prices of similar products imported from each region?
- (c) Is the variation in TR prices between partner countries taken into account when converting TR prices into domestic currency units?
- (d) How are TR trade prices determined?
- (e) Why is some portion of intra-CMEA trade denominated in \$'s? What are the determinants of these \$ prices?
- (f) In what way does bilateralism constrain ex ante trade flows (total, by hard/soft, or for each commodity group)?
- (g) How are bilateral trade flows monitored and adjusted ex post?

VI. Questions directed at understanding the institutional arrangements for conducting foreign trade:

- (a) To what extent do domestic producers and consumers of traded goods have contact with their foreign counterparts?
- (b) What are the specific incentives to produce for foreign markets? How do these incentives differ between exports to the West and to the CMEA?
- (c) Which central economic institutions conduct foreign-trade negotiations? What incentives do these institutions face?
- (d) To what extent can central administrators issue orders on production for foreign trade?
- (e) What criteria govern the issue of permits to import goods?
- (f) What help can enterprise managers obtain in marketing their goods in the West?
- (g) Which officials in CMEA trading partner countries monitor the quality of imported goods?
- (h) To what extent are the trade negotiations between different CMEA countries linked, either on an informal or formal basis?

Appendix C:

PROOFS OF PROPOSITIONS

Reintroducing the notation from the text:

P_{gji} = foreign currency price of the i th good of type g exported to country j

X_{gji} = quantity of the i th good of type g exported to country j

F_{gji} = domestic price of the i th good of type g exported to country j

Q_{gji} = foreign currency price of the i th good of type g imported from country j

M_{gji} = quantity of the i th good of type g imported from country j

S_{gji} = domestic price of the i th good of type g imported from country j

The proofs require that notation be introduced for the production levels of each good:

x_{gji} = domestic production of the i th good of type g that is exported to country j

m_{gji} = domestic production of the i th good of type g that is imported from country j

To maintain brevity in the following, introduce the 'dot' notation for vectors: a variable with a dot as one subscript represents the vector obtained by listing all variables found by varying the subscript that is a dot. For example:

$$X_{gj.} = (X_{gj1}, X_{gj2}, \dots, X_{gjn}) .$$

To simplify, assume that there is multilateral trading in the Western region (i.e., if $g = w$, $j = \$$), that all goods in the Eastern region are either soft or hard, and that there are only two Eastern countries (i.e., if

$g \neq w, j = 1 \text{ or } 2).$

As is usual in the analysis of shadow prices, the existence of some societal welfare function is assumed. Such a function is merely a tool of analysis. The final results do not depend upon the nature of this function which can be written as:

$$U(x_{w\$}, - X_{w\$}, m_{w\$} + M_{w\$}, x_{s1}, - X_{s1}, x_{h1}, - X_{h1}, m_{s1} + M_{s1}, m_{h1} + M_{h1}, x_{h2}, - X_{h2}, x_{s2}, - X_{s2}, m_{s2} + M_{s2}, m_{h2} + M_{h2}). \quad (\text{A.1})$$

Two points should be noted concerning this function. First, it has been assumed that all goods are objectives of social welfare. Given the use to which the present model is put, this is not an important assumption. Only notational complexity would change if the distinction between consumption and intermediate goods were made. Second, if one used an aggregate consumption objective as the social welfare function, as is often the case in shadow price analysis, the results obtained would be exactly the same as those derived below.

Using vector products, the balance-of-payments constraints can be easily defined:

$$P_{w\$} X_{w\$} - Q_{w\$} M_{w\$} = 0 \quad (\text{A.2})$$

$$P_{gj} X_{gj} - Q_{gj} M_{gj} = 0 \quad j=1, 2 \text{ and } g=h,s \quad (\text{A.3})$$

To make the model complete, one needs a constraint representing production relations in the economy. These relations will be represented in the most general manner possible:

$$F(x_{w\$}, m_{w\$}, x_{s1}, x_{h1}, x_{s2}, x_{h2}, m_{s1}, m_{s2}, m_{h1}, m_{h2}) = 0 \quad (A.4)$$

In this formulation, again to avoid notational complexity, non-negativity constraints are ignored. Such constraints could be easily added to the model, but they would in no way change the nature of the results.

The economy's optimal trading pattern is found by maximizing (A.1) subject to the constraints (A.2), (A.3), and (A.4). The social value of a currency is the increase in optimal social welfare that could be obtained by having the use of one additional currency unit. (For example, the social value of a \$ is the extra welfare resultant from adding \$1 to the left-hand-side of constraint (A.2). Using the usual theory of maximization, the value of a currency is then the Lagrange multiplier attached to the constraints (A.2) and (A.3). Let these multipliers be $\lambda_{w\$}$ for (A.2) and λ_{gj} ($j=1, 2$ and $g=h, s$) for (A.3). Thus, in the present model, one effectively has five 'currencies' - four of which result from the fact that hard and soft goods are balanced separately in the two Eastern countries.

Proposition 1 follows immediately from the above formulation of the problem. Nowhere in (A.1) - (A.5) does the official value of the transferable ruble occur. Hence, shadow prices must be independent of this value.

Maximizing (A.1) subject to the constraints gives the following conditions (among others):

$$-\frac{\partial U}{\partial X_{gji}} = \lambda_{gj} P_{gji} \quad g_j = w\$ \text{ or } g = h, s; j = 1, 2 \quad (A.6)$$

and

$$\frac{\partial U}{\partial M_{gji}} = \lambda_{gj} Q_{gji} \quad g_j = w\$ \text{ or } g = h, s; j = 1, 2 \quad (A.7)$$

On the assumption that there are no distortions in the domestic economy, the marginal social value of a good equals its domestic price. Therefore,

$$\frac{\partial U}{\partial X_{gji}} = P_{gji} \text{ and } \frac{\partial U}{\partial M_{gji}} = S_{gji}. \quad (\text{A.8})$$

From (A.6), (A.7), and (A.8),

$$\lambda_{gj} = \frac{P_{gji}}{R_{gji}} = \frac{Q_{gji}}{S_{gji}} \quad \text{for } gj = w\$ \text{ or } g = h, s; j = 1,2 \text{ and all } i. \quad (\text{A.9})$$

In theory then, the relevant value of a currency can be obtained by comparing the foreign and domestic prices of a single good. However, in practice, all the elements of (A.9) are unlikely to hold simultaneously. This suggests that the λ_{gj} should be obtained by employing a weighted average of the various relevant elements of (A.9). The obvious weights are the quantities of goods traded. Hence, for example, multiplying both sides of (A.6) and (A.8) by X_{gji} , combining both equations, and summing over i , one obtains

$$\frac{1}{\lambda_{gj}} = \frac{\sum_i P_{gji} X_{gji}}{\sum_i R_{gji} X_{gji}}. \quad (\text{A.10})$$

Using similar methods, it is easy to see that

$$\frac{1}{\lambda_{gj}} = \frac{\sum_i Q_{gji} M_{gji}}{\sum_i S_{gji} M_{gji}}. \quad (\text{A.11})$$

Hence, $E_{gj}^X = E_{gj}^M = 1/\lambda_{gj}$. Since $\lambda_{w\$}$ is the social value of a \$ and λ_{gj} ($gj \neq w\$$) is the social value of a TR used for good g in country j ,

$\lambda_{gj}/\lambda_{w\$}$ is the dollar value of a TR so used. Proposition 2 follows immediately.

The easiest way in which Propositions 3 and 4 can be proved is to imagine a situation in which the TR prices double in one, and only one, of the constraints in (A.3), with all other prices constant. Then, no decisions on real valuables will change. The relevant λ_{gj} will fall by 50%. Since all other λ 's remain the same, the values of TR's used in different countries, or on different types of goods, must be different, either before or after the changes. Propositions 3 and 4 follow.

The valuation of debt is easily seen using the above discussion. Suppose a country must pay back one TR to country j , a proportion α_j of which must be in hard goods. The the loss in social welfare is

$\alpha_j \lambda_{nj} + (1-\alpha_j) \lambda_{sj}$. In dollar terms this loss is

$$\alpha_j \frac{\lambda_{nj}}{\lambda_{w\$}} + (1-\alpha_j) \frac{\lambda_{sj}}{\lambda_{w\$}}$$

and Proposition 5 is proved.

When a one-TR export to country j is reclassified from soft to hard, social welfare increases by $\lambda_{nj} - \lambda_{sj}$. As a proportion of the original social welfare from the export, the increase is $(\lambda_{nj}/\lambda_{sj}) - 1$. Hence, the proportionate gain is:

$$\left(\frac{\lambda_{nj}/\lambda_{w\$}}{\lambda_{sj}/\lambda_{w\$}} \right) - 1$$

and Proposition 6 is proved.

When deriving Propositions 7 and 8, extra constraints must be placed on the maximization of (A.1). As these constraints are inequalities, the Kuhn-Tucker theorem must be used. Let the 'u' subscript represent the Soviet Union. Then, if imports of hard goods from the Soviet Union are subject to a quantity constraint, the relevant necessary condition in (A.7) must be replaced by:

$$-\theta_i + \frac{\partial U}{\partial M_{hui}} = \lambda_{hu} Q_{hui} \quad (A.12)$$

where θ_i is an additional Lagrange multiplier and $\theta_i \geq 0$, with $\theta_i > 0$ if the country would like to import more of hard good i . Thus

$$-\theta_i + S_{hui} = \lambda_{hu} Q_{hui} \quad (A.13)$$

and

$$-\sum_i M_{hui} \theta_i + \sum_i M_{hui} S_{hui} = \lambda_{hu} \sum_i Q_{hui} M_{hui} \quad (A.14)$$

Thus, if one or more constraints are effective

$$\frac{1}{\lambda_{hu}} > \frac{\sum_i Q_{hui} M_{hui}}{\sum_i M_{hui} S_{hui}} = E_{hu}^M$$

Now, since $\lambda_{hu}/\lambda_{w\$}$ is the dollar value of one TR's worth of imports from the Soviet Union, the use of C_{hu}^M ($= E_{w\$}^M/E_{hu}^M > \lambda_{hu}/\lambda_{w\$}$) will lead to an overvaluation of the TR. Proposition 7 is proved. Proposition 8 is proved in an analogous manner.

When the conditions assumed for Proposition 9 apply, the constraints (A.3) are no longer applicable in trade relations with the Soviet Union. They are replaced by an overall balance-of-trade constraint and two conditions on the structure of trade:

$$P_{hu} X_{hu} + P_{su} X_{su} - Q_{hu} M_{hu} - Q_{su} M_{su} = 0 \quad (A.15)$$

$$P_{hu} X_{hu} \geq b (P_{hu} X_{hu} + P_{su} X_{su}) \quad (A.16)$$

$$Q_{su} M_{su} \geq e (Q_{su} M_{su} + Q_{hu} M_{hu}) \quad (A.17)$$

(In this formulation, there is no difference between the marginal proportion of hard goods in exports and the average proportion. Such a difference could be trivially introduced by adding a positive constant to the right-hand-side of (A.16). For soft goods, the same change could be made to (A.17). Such changes do not affect the results, because shadow prices depend only on marginal values.

Using the Kuhn-Tucker theorem with λ_a , λ_x and λ_m as the Lagrange multipliers of (A.15), (A.16) and (A.17) respectively, one can derive the following necessary conditions:

$$\frac{\partial U}{\partial X_{hui}} + \lambda_a P_{hui} + \lambda_x P_{hui} (1-b) = 0 \quad (A.18)$$

$$\frac{\partial U}{\partial M_{hui}} - \lambda_a Q_{hui} - \lambda_m e Q_{hui} = 0 \quad (A.19)$$

$$\frac{\partial U}{\partial X_{sui}} + \lambda_a P_{sui} - \lambda_x b P_{sui} = 0 \quad (A.20)$$

$$\frac{\partial U}{\partial M_{sui}} - \lambda_a Q_{sui} + \lambda_m (1-e) Q_{sui} = 0 \quad (A.21)$$

Proposition 9 follows upon substituting the domestic prices for marginal social values, solving for λ_a , and realizing that λ_a is the marginal social value of a TR.

FOOTNOTES

1. Note that surpluses and deficits can arise under bilateralism when agreements cover time periods not coterminous with the reporting periods of trade statistics. For example, deficits currently run by the Soviet Union will be settled over a number of years.
2. See van Brabant (1980) and Marrese and Vanous (1983) for differing views.
3. See van Brabant (1977) for details.
4. See Hewett (1974) for a detailed summary of CMEA pricing rules and an analysis of their consequences.
5. For reasons given below, the average level of Soviet trade prices will be lower than those for the CMEA as a whole.
6. Marrese and Vanous (1983 p. 122) calculate comparisons of dollar prices versus ruble prices for 5 commodity groups over a 19-year period. They find ruble prices higher in only 7% of the comparisons.
7. These points will be made in greater detail in Section IV.
8. For a detailed discussion of planning "from the achieved level" see Birman (1978).
9. In fact, reality is somewhat more complicated than this stylized description. The degree of softness can vary. As a result, it seems that trade negotiations often result in many separate balances.
10. Marrese and Vanous (1983) refer to the Soviet Union as giving Eastern Europe an "implicit trade subsidy".
11. Given CMEA prices, the re-exporting of Soviet raw materials to the West would be immensely profitable for Eastern European countries.
12. To see how such an artifact can easily arise, consider, for example, the following scenario. No inflation in TR prices, dollar price inflation and the arbitrary exchange rate remains fixed. The share of socialist trade would fall.
13. See the discussion in Sections IV and V.
14. The conclusion cannot be made definitive here. To do so would require direct information on how the tables in the Country Study were constructed.

15. Zoeter (1981) is used solely as an example. Marer (1981 p. 67), Matusek (1981 p. 99) and World Bank (1984 p. 129) all present similar types of data.
16. These figures have been derived in rough calculations based on data in Matusek (1981) and Marrese and Vanous (1983). They are for illustrative purposes only.
17. The data are taken from the World Bank's "Romania Economic Memorandum" (1985 p. 10).
18. I interpret certain statements in Hungary: Economic Developments and Reforms as examples of such policy advice. See pp.-33, 42, 61 of World Bank (1984).
19. See Section II(f) for a brief discussion of the distinguishing characteristics of Soviet commercial relations. Brada (1985) provides a more detailed review of current views.
20. In fact, one has many sets. TR's used in hard goods trade are different from those used in soft. Also, the \$'s used in bilaterally-balanced intra-CMEA trade are different from those in multilateral trade.
21. For some countries, these data might have already been converted into domestic currency. If so, it is assumed that one knows the rates at which the conversion has been made. Then one can easily derive the original TR and convertible currency figures.
22. One is assuming, of course, that economic welfare can be defined unambiguously. This assumption is implicitly present in all practical policy analyses, in the meaningful construction of all aggregate measures of economic activity, and in a large proportion of theoretical welfare economics exercises. It seems judicious, therefore, not to question the assumption here. In a study particularly pertinent to the present exercise, Kornai (1967, p. 421) shows how a single welfare criterion can be used, even if non-comparable goals of economic policy are present.
23. This is not to suggest that such methodological discussions are irrelevant here. Instead, given present knowledge on the CMEA, they could only be informative at a much later stage.
24. Of course, the official exchange rate could be equal to the shadow rate by coincidence, or even by design. As will be shown in Section V, some CMEA countries are moving towards the use of official exchange rates that implicitly reflect shadow price calculations.
25. This is especially difficult for soft goods.
26. See Bacha and Taylor (1971) for a review of the literature.

27. Additionally, one must know to which country the debt is owed. This is a lesser problem for two reasons. Most CMEA debt will be owed to the Soviet Union and the variation in real valuation of trade flows is less between countries than between hard and soft goods.
28. These calculations are extremely rough. They also ignore some of the issues raised in section IV(f). Nevertheless, the approximate order of magnitude is probably reliable.
29. The use of the term "bias" does not imply that the data has been manipulated in any way. Rather, all that is implied is that data collection procedures in a country do not reflect the requirements of the particular policy analysis.
30. Here again, the data on dollar-denominated trade flows within the CMEA is ignored to avoid making the discussion too complex.
31. In the World Bank's Hungary study, such information was not given.
32. If the debt is given in local currencies, then the discussion in the previous paragraph will apply.
33. See Marer (1981) on Hungary and Michalski (1985) on Poland. van Brabant (1985 p. 28) states that the methodology underlying the Romanian rate is unknown.
34. For Poland this date was early 1981 (van Brabant 1985 p. 28) and, at least in theory, the exchange rate changes if the cost of earning a unit of foreign currency changes by more than 5%.
35. This point applies to the 1984 study.
36. The Marrese-Vanous study focuses on the Soviet Union. Thus, other intra-CMEA trade is ignored.
37. In fact, because of the difficulty of deriving unit values for each time period, Marrese and Vanous (1984) use this quicker method study to derive estimates for some time periods.
38. See World Bank (1984 p. 176-7) for an example of such data.
39. Even then one must remember that the methods outlined in V(c) make a number of assumptions about the comparability of CMEA countries.
40. See the discussion in Vanous (1984).
41. Average CMEA TR/\$ exchange rates are used rather than those specific to Romania, which are probably less reliable. If the Romanian rates were used, the features of the example would be enhanced.

42. The structure of non-Soviet intra-CMEA trade is very similar to that of Soviet imports from the rest of the CMEA. Hence, the present assumption seems appropriate when revaluing Romanian exports.
43. The recalculations contain an error due to the treatment of \$ CMEA exports as if they were originally valued in TR's. Given the small share of CMEA trade in \$'s, that error cannot be significant in the context of the present example.

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