# USSR-LDC Trade: An Economic and Quantitative Analysis

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A Technical Intelligence Report



*SOV 85-10010*
*February 1985*
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Directorate of
Intelligence

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This paper was prepared

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under an external contract with the Office of Soviet Analysis.

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Comments and queries are welcome and may be directed to the Chief, Soviet Economy Division, SOVA,

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## Preface

The research contained in this report was funded under an external research contract with the Office of Soviet Analysis and carried out from July 1982 to October 1983. [redacted] 25X1

[redacted] 25X1

# USSR-LDC Trade: An Economic and Quantitative Analysis [redacted] 25X1


## Summary

*Information available as of 31 October 1983 was used in this report.*

An analysis of Soviet trade with the LDCs since the early 1970s using a new body of statistics suggests that some common perceptions of the nature and importance of this trade are mistaken. [redacted] 25X1

The growth in the volume of Soviet-LDC trade since 1970 has exceeded the rate of growth in Moscow's trade with developed Western economies, although the value of trade with the developed West grew at a faster rate. Hence, price trends in this trade have tended to move against the USSR:

- Real Soviet imports from LDCs increased over the period at an average annual rate of 8 percent, but the pattern of growth was erratic. Real imports declined in each year during 1976-79 and then climbed in 1980 and 1981 as a result of massive food imports—mainly from Argentina, Brazil, India, and Thailand.

- Real Soviet exports to LDCs grew at an average rate of 5.5 to 9.5 percent per year in 1971-81, primarily because of a surge in military exports. Identified (primarily civilian) exports, however, stagnated in real terms during 1971-75 and have grown by only 2.5 to 5 percent per year since then.[1]

- Soviet terms of trade with the developing countries have deteriorated since the early 1970s, whereas terms of trade with the industrialized West have improved. [redacted] 25X1

From the LDC viewpoint, the USSR has not proved to be as important a trade partner as is sometimes believed in the West. In particular, it has not provided a substantial market for LDC manufactures:

- Soviet trade with the LDCs is still highly concentrated among five to 10 trading partners.
- Real reported exports to socialist-oriented clients and oil-exporting countries grew more rapidly than exports to the LDCs as a whole in 1971-81.
- Soviet purchases from non-socialist-oriented, non-oil-exporting countries, on the other hand, accounted for most of the growth in real imports from the LDCs during this period.
- Soviet imports from the Third World have been increasingly dominated by raw materials, especially agricultural commodities. The share of manufactured products in Soviet imports has diminished since the early 1970s. [redacted] 25X1


[1] This estimate assumes that Soviet prices for machinery and equipment and unspecified exports (believed to be mostly if not entirely military-related items) grew at an average annual rate of 4.5 percent to 9 percent. [redacted] 25X1

The Soviets have long claimed that the USSR, and the "socialist" countries in general, represent relatively fast-growing and stable markets for the raw material exports of the developing countries. This was a common assertion in Soviet writings of the 1950s and 1960s, and it was frequently voiced in the United Nations Conference on Trade and Development (UNCTAD) forums in the 1970s in the context of continued debate on The New International Economic Order. Analysis of the trade of the USSR, West Germany, Japan, and the United States with the LDCs shows that:

- The Soviet Union accounted for 17 percent of combined imports by the four countries of nine important primary products in the 1960s. In terms of the market size for these products, the USSR ranked third after the United States and West Germany.

- In 1971-81 the Soviet share of the combined imports increased to 23 percent, and the USSR and the United States shared first place in terms of market size.

- Soviet real imports of primary products from the LDCs seem to have been more variable than those of the average developed West importing country in 1960-70. The USSR ranked last in terms of variability of real imports in the 1970s, but the differences were not great enough to be statistically significant.

- Examination of more than 20 years of Soviet imports of raw materials suggests some slight relative improvement in the stability of the prices the USSR pays for LDC exports, although Soviet performance in this respect must be considered as essentially no different from that of Western market economies. 25X1

In sum, few LDCs outside the Soviet orbit depend heavily on the Soviet Union as a trade partner. Soviet shares of total trade have declined for some of the USSR's more important LDC trade partners but have increased for a number of other LDCs. Instances in which the Soviet share has fallen were twice as frequent as instances in which the share increased. This trend, in conjunction with the concentration of Soviet import growth in the raw materials group, suggests that the economic interdependence between the USSR and the LDCs probably has increased more slowly over the past 10 years than is often perceived in the West and claimed by the Soviets. 25X1

A statistical analysis of the determinants of Soviet-LDC trade suggests that political factors have been significant to some degree. The level of Soviet exports to an individual LDC was found to be related to whether it had a "socialist orientation" and to whether it had a soft currency clearing agreement with the USSR. Soviet imports, however, seem to be unrelated to the socialist orientation of the exporting countries. 25X1

The issue of how much market power the Soviet state trading monopoly can exert on prices cannot be settled with the available evidence. The trade data, however, point to relative price discrimination in favor of the USSR's trading partners in the Council of Mutual Economic Assistance (CEMA). Moreover, this discrimination appears to have increased over time. While this trend probably results mainly from a combination of political factors, it also reflects an inertia built into the intra-CEMA foreign trade system. The Soviets also appear to discriminate against socialist-oriented and soft currency countries, possibly because the USSR may have relatively more bargaining power with these countries than with other non-Communist LDCs. 25X1

Finally, because the USSR continues to conduct its trade relations with several of its important trading partners through bilateral clearing accounts rather than in hard currency, the role these arrangements play in Soviet-LDC trade was investigated. Since the early 1970s, a number of soft currency agreements have been terminated, and trade has flourished most with those countries with which settlements are made in hard currency. Nevertheless, imports from Moscow's soft currency trade partners seem to be more diverse and stable than imports from hard currency partners. This trade also seems to include a higher proportion of manufactured commodities. Thus, it appears that Moscow's soft currency partners still benefit by maintaining their clearing account arrangements with the USSR. 25X1

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# USSR-LDC Trade: An Economic and Quantitative Analysis

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## Introduction

The goal of the contract research described in this technical intelligence report was to increase understanding of Soviet trade with the Third World. A great deal of time was first spent in compiling statistics—that is, data on the dimensions of Soviet-LDC [2] trade by country and commodity. That such an effort played an important role in the research will come as no surprise to students of the USSR's foreign trade, especially in view of the relative paucity and the recent deterioration in Soviet statistics. With the help of these statistics on the value and volume of LDC trade with the Soviet Union, the contractor proceeded to investigate a number of questions that before now have been looked at only in passing or not at all because of the lack of adequate data. His findings are summarized in this report.

This report first sets out the aggregate trends in the volume of Soviet-LDC trade in 1971-81 and estimates the changes in the terms of this trade over the period. In the next section, a disaggregated view of the trade is presented. Topics covered include the commodity composition of the trade, the distribution of trade by country group, the payment mechanisms, and the degree of concentration in this trade. The results of an econometric analysis of the determinants of the size and direction of Soviet-LDC trade also are described.

In the following three sections, the report summarizes the contractor's research on three questions that have been discussed extensively over the years:

- Does the USSR offer more favorable prices in buying from and selling to LDCs who are political allies, strategically important, or participants in bilateral clearing arrangements with the USSR?
- Does the Soviet Union represent a more stable and faster-growing market for LDC primary products than developed Western economies?
- How influential are bilateral clearing agreements in explaining Soviet trade with developing countries?

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Finally, a series of appendixes (a) explain the procedures followed in delivery price and quantity indexes for Soviet-LDC trade, (b) set out the definitions of socialist-oriented LDCs and soft and hard currency trading partners employed in the research, (c) provide the statistical basis for the findings regarding determinants of Soviet-LDC trade, and (d) reviews the methodology used to investigate price discrimination in this trade.

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## Trends in Aggregate Real Trade and Terms of Trade

The initial report focuses on the volume and terms of trade in Soviet commerce with the Third World during 1971-81. The developing countries studied were all those not classified as "socialist" LDCs in Soviet foreign trade statistics. The study included 73 developing countries for which Soviet trade statistics were available. The three developing country members of the Council for Mutual Economic Assistance (CEMA) (Cuba, Mongolia, and Vietnam) and socialist LDCs (Laos, North Korea, and China) were excluded.

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## Basis for the Estimates

Because of the dramatic deterioration in the coverage of Soviet foreign trade statistics since 1975-76, analysis of prices, quantities, and terms of trade has become very difficult. Soviet foreign trade with the developing countries is no exception. In particular, the reduced amount of data on quantities traded (that is, trade volume) and the Soviet tendency to report trade values at a higher level of aggregation for many products have made it impossible to calculate meaningful unit values from Soviet statistics.

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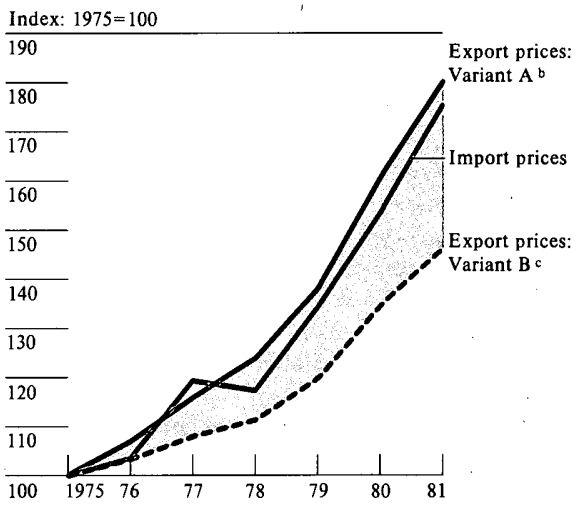
[2] This paper uses the Soviet definition of less developed countries, which encompasses: (1) all countries in Africa except the Republic of South Africa; (2) all countries in East Asia except Hong Kong, Japan, Laos, and Vietnam; (3) all countries in Latin America except Cuba; and (4) all countries in the Middle East except Israel. The terms less developed countries (LDCs), the Third World, and developing countries are used interchangeably.

A rather eclectic approach had to be followed in estimating price and quantity trends in recent Soviet trade with the developing countries. For machinery and equipment and "residual" exports—largely arms deliveries unidentified by country and/or commodity—indexes of world market prices and evidence of overall movements in Soviet export prices were used to derive two "synthetic" price indexes. Specifically, it was assumed that the average annual increase in ruble export prices for these two commodity groups fell within a range of 4.5 to 9 percent during 1971-81. Unit values for trade in fuels, metals, and minerals, and a few other primary or intermediate products were calculated from official Soviet foreign trade statistics for 1971-76, and synthetic price indexes were created on the basis of movements in world market price for these products after 1976. For all remaining products—including chemicals, building materials, other nonfood raw materials, foodstuffs, and industrial consumer goods—price indexes were developed from unit value calculations at the individual country-product level.

These price indexes were constructed for Soviet trade with each LDC and were aggregated to obtain overall price indexes for aggregate exports and imports, respectively. Quantity indexes were then derived for exports and imports using available data on trade values and the constructed aggregate price indexes. (See appendix A for a more complete description of the calculation of the price and quantity indexes presented in the report.)

**Figure 1**
**USSR-LDC Trade: Trends in Soviet Export and Import Prices[a], 1975-81**




[a] Some 73 developing countries for which Soviet trade statistics are available are examined in the report.

[b] Variant A: Machinery and equipment export prices and residual export prices are assumed to increase at 9 percent per annum.

[c] Variant B: Machinery and equipment export prices and residual export prices are assumed to increase at 4.5 percent per annum.

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**Results**

The calculations reflected several developments in aggregate Soviet trade with the developing countries over the past decade. From 1971 to 1981, the *prices of Soviet exports to LDCs of identified trade (presumed to be civilian commodities) tended to rise more rapidly than prices for Soviet residual trade (presumed to be military exports).* This trend probably reflects the important role that exports of crude oil and oil products continue to play in Soviet trade with these countries. In 1981, for example, petroleum exports accounted for 38 percent of total identified Soviet exports to the LDCs. Over the entire decade, the reported calculations indicate that Soviet export prices to the developing countries increased at an average annual rate of 6.9 percent to 10.7 percent.

*Second, prices for Soviet imports from LDCs have risen over the past decade at an average annual rate of about 11 percent.* The rate of price increase slowed during 1976-78 but picked up again in 1979 as prices for oil, natural gas, and some foodstuffs increased rapidly on world markets (see figure 1).

*Third, Soviet net barter terms of trade with the developing countries have deteriorated since the early 1970s.*[3] How sharply they have declined depends a

[3] Net barter terms of trade reflect how well Soviet export prices have done vis-a-vis import prices. Declining terms of trade indicate that increases in Soviet export prices have not been sufficient to keep up with increases in import prices, thus the USSR must pay more in real exports to pay for the same quantity of goods imported in the base year. Improvement in the USSR's terms of trade would be the opposite situation.

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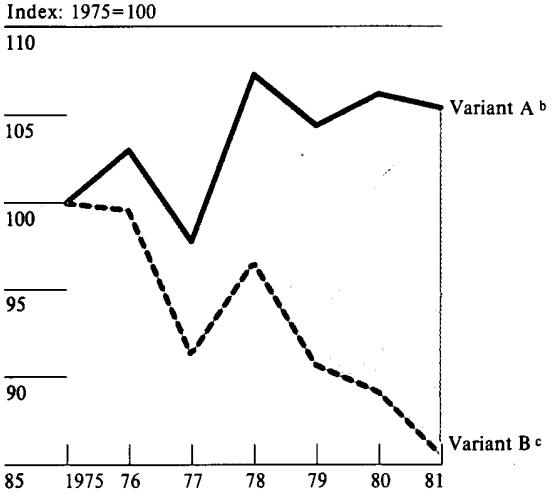
**Figure 2**
**USSR: Net Barter Terms of Trade With the LDCs, 1975-81 [a]**




[a] Net barter terms of trade reflect how well Soviet export prices have done vis-a-vis import prices. Declining terms of trade indicate that increases in Soviet export prices have not been sufficient to keep up with increases in import prices. Thus the USSR must pay more in real exports to buy the same quantity of goods imported in the base year. Improvement in the USSR's terms of trade would be the opposite situation.

[b] Variant A: Machinery and equipment export prices and residual export prices are assumed to increase at 9 percent per annum.

[c] Variant B: Machinery and equipment export prices and residual export prices are assumed to increase at 4.5 percent per annum.

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great deal, however, on which export price variant is presumed to have prevailed. Under variant A, where machinery and equipment and "residual" (or military) export prices are assumed to have grown at 9 percent per annum, there is a slight terms-of-trade improvement since 1975 and only a 2.5-percent cumulative deterioration since 1971. Variant B, on the other hand, assumes a 4.5-percent average annual rate of growth of prices for the same commodity groups and appears to be more consistent with aggregate Soviet export price trends for these products as reflected in official Soviet statistics. This variant yields a 15-percent cumulative terms-of-trade decline against the LDCs since 1975 and a more than 30-percent decline since 1971 (see figure 2).

Regardless of price variant, *the real growth of residual exports to LDCs by the USSR surpasses the real growth of identified exports during 1971-81.* Residual exports, which are probably arms deliveries, have increased in real terms at an average annual rate of 10 to 15 percent over the past decade. Identified exports, however, essentially stagnated in real terms from 1971 to 1975 and since 1975 have grown by only 2.5 to 5 percent a year. Overall real exports grew at an annual average rate of 5.6 to 9.4 percent (see figure 3). The much faster growth of residual exports has caused that group to play an important role in overall Soviet exports despite the slower rate of increase in their prices. The proportion of residual exports in total Soviet exports to LDCs climbed from 47 percent in 1971 to 51 percent in 1975, and exceeded 60 percent in 1977-79. Because variant B suggests such a high (15 percent) rate of growth in the volume of Soviet residual exports, it is likely that Soviet prices of these exports have been growing at a faster rate than assumed under that variant—that is, greater than 4.5 percent per annum.

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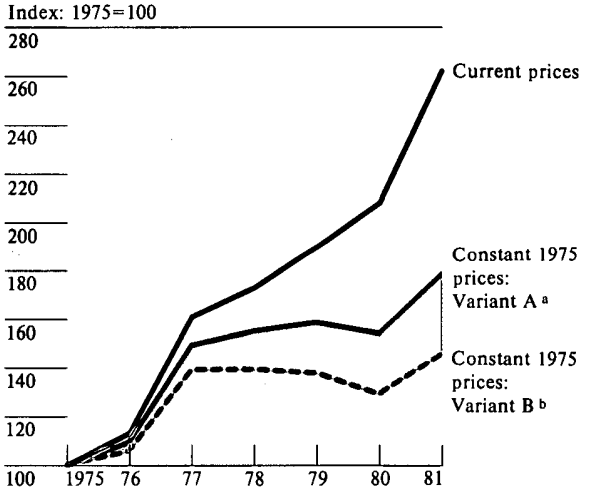
**Figure 3**
**USSR: Trends in Exports to the LDCs, 1975-81**




[a] Variant A: Machinery and equipment export prices and residual export prices are assumed to increase at 4.5 percent per annum.

[b] Variant B: Machinery and equipment export prices and residual export prices are assumed to increase at 9 percent per annum.

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**Figure 4**
**USSR: Trends in Imports From the LDCs, 1975-81**

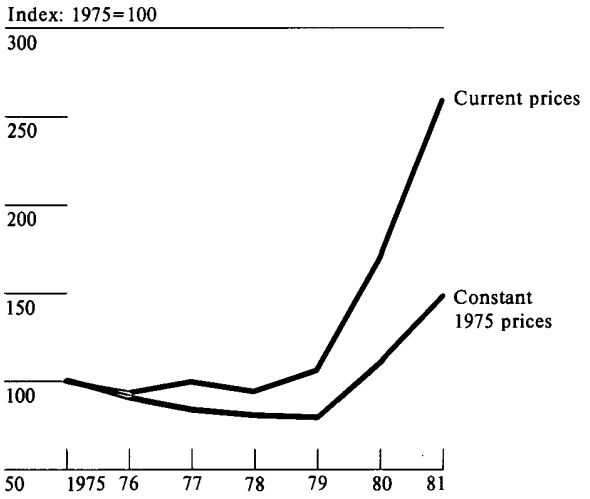


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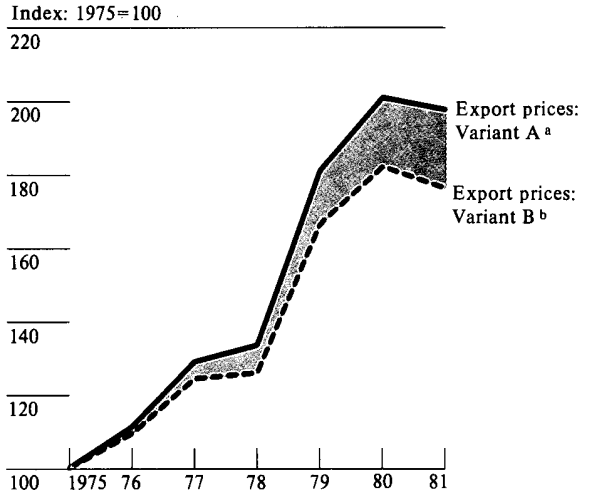
**Figure 5**
**USSR: Implied Terms of Trade With Industrially Developed Countries, 1975-81**




a Variant A: Machinery and equipment export prices and residual export prices are assumed to increase at 4.5 percent per annum.
b Variant B: Machinery and equipment export prices and residual export prices are assumed to increase at 9 percent per annum.

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*Over the past decade, real Soviet imports from the LDCs increased at about an 8-percent average annual rate, although the growth pattern was erratic within this period.* Real imports grew at an average rate of 9.2 percent per annum during 1971-75, declined each year from 1976 to 1979, and then surged again as massive Soviet grain purchases were redirected to developing countries, particularly Argentina, in 1980 and 1981 (see figure 4). The growth in real imports over the past decade matched the growth in real exports by averaging the growth rates under variants A and B.

Finally, the calculations for Soviet trade with the LDCs were used in conjunction with official Soviet statistics on trade with all "nonsocialist" countries to derive rough measures of trends in prices, trade volume, and terms of trade in Soviet economic relations with the industrialized West. *The calculations suggest that prices of Soviet exports to the industrialized West rose in 1976-81 at an average annual rate of 14 to 16 percent, while prices of Soviet imports from this region grew at an average rate of about 4 percent.*[4] In contrast to the stagnation or possible cumulative deterioration of Soviet terms of trade with the LDCs of up to 15 percent in this period, Soviet terms of trade with the industrial West improved at an average annual rate of 10 to 12 percent. Since the mid-1970s, the volume of Soviet exports to the LDCs, particularly arms exports, has apparently grown at a much faster rate than have Soviet exports to the West. Only because of the recent surge in Soviet imports of foodstuffs from LDCs has the volume of Soviet imports from the LDCs matched the growth of real imports from the West since the mid-1970s (see figure 5).

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**Disaggregated Trends and Determinants of Soviet-LDC Trade**

The statistical base also permits an analysis of recent patterns and trends in Soviet foreign trade with the

[4] It is unlikely that prices of Soviet imports from the developed West really grew at such a slow rate during 1976-81, especially given the high rate of Western inflation for the period.

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**Table 1** *Percent*
**USSR: Commodity Composition of Exports to the Developing Countries, 1970, 1975, and 1980**

| Commodity Group | 1970 | 1975 | 1980 |
|---|---|---|---|
| **Total** | **100.0** | **100.0** | **100.0** |
| Machinery and equipment | 32.9 | 24.3 | 20.3 |
| Fuels | 3.5 | 10.2 | 16.8 |
| Ores, concentrates, and metals | 5.8 | 3.3 | 1.2 |
| Chemicals and products | 1.0 | 3.0 | 1.9 |
| Building materials | 0.6 | 1.0 | 0.6 |
| Timber, pulp, and paper | 3.0 | 3.5 | 2.3 |
| Textile | | 0.6 | 0.4 |
| Other materials of animal, vegetable origin | 0.1 | 0.1 | 0.1 |
| Food and foodstuffs | 4.7 | 2.7 | 1.2 |
| Industrial consumer goods | 1.5 | 1.1 | 0.5 |
| Residual | 46.9 | 50.2 | 54.7 |

Source: Calculated in current prices from *Vneshniaia torgovlia SSSR*, various issues.

**Table 2** *Percent*
**USSR: Commodity Composition of Imports From the Developing Countries, 1970, 1975, and 1980**

| Commodity Group | 1970 | 1975 | 1980 |
|---|---|---|---|
| **Total** | **100.0** | **100.0** | **100.0** |
| Machinery and equipment | 0.2 | 0.6 | 0.8 |
| Fuels | 3.7 | 19.3 | 13.9 |
| Ores, concentrates, and metals | 4.3 | 3.5 | 3.0 |
| Chemicals and products | 11.4 | 3.7 | 5.0 |
| Building materials | | | 0.1 |
| Timber, pulp, and paper | 0.5 | 0.7 | 0.5 |
| Textile raw materials | 25.7 | 11.5 | 5.0 |
| Other materials of animal, vegetable origin | 8.5 | 5.0 | 6.7 |
| Food and foodstuffs | 33.2 | 44.3 | 48.4 |
| Industrial consumer goods | 12.5 | 8.8 | 7.1 |
| Residual | | 2.6 | 9.4 |

Source: Calculated in current prices from *Vneshniaia torgovlia SSSR*, various issues.

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developing countries at a more disaggregated level, largely by using the unit values implied by value and quantity data and other information to calculate changes in the volume of trade and in export and import prices.

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**Composition of Trade**

Over the past decade the trade residual (Soviet arms sales) was the most dynamic source of real growth in Soviet exports to the LDCs. Real exports of petroleum and petroleum products also accelerated until 1979. After stagnating during 1971-75, real exports of machinery and equipment also grew at a respectable rate after the mid-1970s. Real exports of the other major commodity groups, however, either stagnated or actually declined in the latter half of the 1970s. In nominal or current prices the share of exports accounted for by petroleum exports and arms sales increased over the past decade, largely at the expense of machinery and equipment shares and exports of ores and metals (primarily iron and steel products) (see table 1).

From 1970 to 1975, Soviet real imports of petroleum and ores, metals, and concentrates from the developing countries climbed swiftly. From 1978 to 1981, however, the volume of petroleum imports—apparently intended for reexport—has declined, as have identified imports of ores and metals. This estimated downturn in real imports of ores and metals may be exaggerated, however, and could be completely misleading (see table 2). The rapidly expanding Soviet import residual probably contains at least some ores and metals trade that were in the past included in identified trade.

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From 1975 to 1979, aggregate real imports from the developing countries apparently declined. The dramatic growth in imports after 1979, however, resulted almost exclusively from large purchases of foodstuffs from such countries as India, Thailand, Argentina, and Brazil. Contrary to Soviet public statements, imports to the USSR from the Third World appear to

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**Table 3**
**USSR: Trends in Terms of Trade With Various LDC Groups, 1975-81**

*1975 = 100*

| | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 |
|---|---|---|---|---|---|---|---|
| Trade with developing countries with a "Socialist Orientation" [a] | 100 | 88 to 90 | 78 to 82 | 86 to 93 | 80 to 90 | 79 to 91 | 74 to 84 |
| Trade with developing "Client Countries" [b] | 100 | 97 to 99 | 80 to 85 | 94 to 103 | 85 to 96 | 82 to 96 | 73 to 88 |
| Trade with developing oil-exporting countries [c] | 100 | 101 to 105 | 101 to 108 | 113 to 126 | 87 to 100 | 58 to 70 | 50 to 63 |
| Trade with developing countries which are neither "Socialist Oriented," nor oil exporters [d] | 100 | 99 to 101 | 90 to 93 | 89 to 93 | 97 to 104 | 118 to 129 | 126 to 139 |

[a] "Socialist Orientation" countries—Afghanistan, Burma, Cambodia, South Yemen, Syria, Algeria, Angola, Benin, Cape Verde, Congo, Ethiopia, Guinea, Guinea-Bissau, Madagascar, Mozambique, Somalia, Tanzania, Grenada, Nicaragua.
[b] "Client Countries"—Afghanistan, South Yemen, Angola, Ethiopia, Mozambique, Cambodia.
[c] Oil-exporting countries—Indonesia, Iraq, Iran, Kuwait, Saudi Arabia, UAE, Libya, Nigeria, Ecuador, Mexico, Venezuela.
[d] Other developing countries—Burkina, Burundi, Camaroon, Central African Republic, Equatorial Guinea, Gabon, The Gambia, Ivory Coast, Kenya, Liberia, Malawi, Mauritania, Mauritius, Niger, Rwanda, Senegal, Sierra Leone, Sudan, Togo, Uganda, Zaire, Zambia, Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay, Burma, Hong Kong, Israel, Jordan, Lebanon, Macau, Malaysia, Philippines, Singapore, Thailand, North Yemen.

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be increasingly dominated by primary products and intermediate goods. The role of manufactured products has diminished since the early 1970s.

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**Trade by Country Group**

Trends in Soviet foreign trade with various country groups were also examined. Because the analysis was limited to statistics on trade with individual countries, most of the trade in arms exports (not included in country statistics) was excluded.

Using Soviet classifications, 19 "socialist-oriented" countries were identified.[5] Real Soviet exports to and imports from the client group of socialist-oriented countries grew at above-average rates in the latter half of the 1970s. Real exports to the nonclient, socialist-oriented countries as reported by the USSR actually fell from 1976 to 1980, and real imports from the group declined continuously from 1975 to 1979. Soviet terms of trade deteriorated by roughly the same amount for trade with both groups of socialist-oriented countries in the 1970s. The cumulative deterioration from 1971 to 1981 ranged from 33 to 47 percent for the 19 socialist-oriented countries (see table 3).

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Real Soviet imports from oil-exporting LDCs declined from 1978 to 1981, but real exports to these countries have grown rapidly, although quite erratically. Much of the fluctuation originates in reported exports to the three principal oil-exporting countries—Iran, Iraq, and Libya. Not surprisingly, Soviet terms of trade with this group of countries have deteriorated by an estimated 52 to 67 percent since 1971.

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In contrast to sales to socialist-oriented clients and oil-exporting LDCs, the volume of Soviet-reported exports "to all other" LDCs declined in the first half of

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[5] These 19 countries do not encompass the six "socialist" LDCs referenced in the first section of this report. A 1982 NATO Economic Committee report—*Soviet Economic Relations With Selected Client States in the Developing World*—classifies Afghanistan, Angola, Cambodia, Ethiopia, Mozambique, and South Yemen as Soviet "clients." The report also examined separately the "oil-exporting" developing countries and an "all other" group of LDCs. (A complete breakdown of country groupings is provided in appendix B.)

the 1970s and has stagnated since 1975. In effect, the dynamism in Soviet civilian exports has been confined to the socialist-oriented clients and oil-exporting countries. Because of the USSR's booming imports of foodstuffs since 1980, however, it is this "all other" group of countries that has accounted for most of the growth in Soviet real imports from the developing world. In contrast to the other two groups, Soviet terms of trade with this third-country grouping have improved, although nearly all of the improvement has occurred since 1979.

Comparisons between the socialist-oriented and all nonsocialist countries highlight the much more rapid price increases received by the socialist-oriented group on their exports to the Soviet Union. This could be attributable to either differences in commodity composition or to conscious price discrimination on the part of the Soviets. Also noteworthy are the consistent reported trade surpluses that the USSR ran with the socialist-oriented—particularly the core client—and oil-exporting countries in the second half of the 1970s contrasted with sizable reported deficits with "all other" LDCs as a group.

**Trade and the Payments Mechanism**

Developing countries can also be categorized by the type of payments mechanism predominating in their trade with the USSR—by hard or soft currency clearing arrangements.[6] Three groups were examined: (1) those with soft currency arrangements throughout 1971-81; (2) those that switched from soft to hard currency clearing during the decade; and (3) countries that traded on a hard currency basis throughout the decade. (See appendix C for a list of the USSR's hard and soft currency trading partners.)

The soft currency country group included four nations that comprise the major LDC markets for Soviet petroleum exports: Afghanistan, India, Turkey, and Morocco. The group also included Egypt and Somalia whose political and economic relations with the USSR deteriorated sharply in the 1970s. Real exports to this soft currency group declined in the first half of the 1970s and have remained consistent with the overall growth of Soviet real "civilian" exports to the LDCs since 1975. The growth of Soviet real imports from the group, however, has lagged the overall average. Soviet terms of trade with the group improved slightly in the first half of the 1970s and also improved as a whole during 1971-81. 25X1

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Real exports to and imports from the group of countries, which switched from soft to hard currency clearing in the 1970s, have declined markedly in recent years, raising the question of whether this decline in trade was influenced by or contributed to the termination of earlier soft currency payments arrangements. Two of these countries, Ghana and Mali, have been characterized by Soviet writers as having deviated from or abandoned their earlier "socialist orientation." 25X1

Soviet reported trade has flourished most with hard currency trading partners. Real Soviet exports to these countries have developed at an above-average pace, and real Soviet imports from this group doubled from 1979 to 1981, largely as the result of massive grain and food imports. Soviet terms of trade with this group deteriorated from 1971 to 1975, improved from 1976 to 1978, and have tended to deteriorate since 1978. 25X1 25X1

**Trade Concentration**

The degree of Soviet trade concentration among major trade partners has declined over the past 20 years, but not at a remarkable rate. Soviet trade still remains highly concentrated among its top partners, although the largest partners tend to change over time and can differ depending upon whether exports or imports are being considered. In 1981, 59 percent of Soviet exports to the LDCs went to just five countries, with 79 percent going to 10 LDCs. Largely because of the large increase in grain imports from Argentina in 1980 and 1981, 65 percent of all Soviet imports from the developing countries in 1981 originated in five countries, and 82 percent originated in just 10 LDCs. 25X1 25X1

[6] The USSR maintains special agreements with selected LDCs that permit the bilateral trade between the two countries to be settled in the nonconvertible local currency of the LDC partner. Trade is transacted through clearing accounts that are expected to be balanced at the end of a given period, usually a year. Thus, the USSR essentially barters its exports for imports from its trade partner. Trade with all other LDCs is, for the most part, settled in freely convertible currencies, such as US dollars, deutsche marks, or French francs.

The Soviet share of the "civilian" exports and imports of 85 developing countries were calculated for 1970-72 and 1979-81, using LDC statistics compiled by the IMF. These calculations suggest some degree of deconcentration of LDC trade with the USSR during the 1970s. Shares of trade with the USSR tended to decline for Moscow's more important trade partners and to increase for a number of other LDCs. Although these calculations could not be made for all LDC trade partners, very few developing countries depend heavily on the Soviet Union as a trade partner. The Soviet share of reported LDC imports declined for twice as many countries as it increased in the 1970s. This trend, in conjunction with the concentration of Soviet import growth in the primary product group, suggests that *the economic interdependence of the Soviet and LDC economies probably has increased more slowly over the past 10 years than is often perceived in the West and claimed by the Soviets* (see table 4).

**Determinants of Soviet-LDC Trade**

The determinants of LDC trade with the Soviet Union were examined in an econometric analysis of the data developed in the first stage of the contract research. Insufficient data, however, prevented detailed estimations of supply-and-demand functions and, therefore, the analysis was confined to a cross section of LDC trade with the USSR in 1975. Other things being equal, it was assumed that a given LDC would trade more with the USSR: (1) the more it trades with the world as a whole (a scale factor); (2) the more complementary its export/import structure is with the import/export structure of the USSR; (3) the closer it is geographically to the Soviet Union (because of lower transaction costs and a greater Soviet geopolitical interest); (4) if it is "socialist oriented"; and (5) if it has a soft currency clearing arrangement with the Soviet Union. Also, given the Soviet stress on machinery and equipment exports in aid agreements, it was further assumed that reported exports might be negatively related to per capita GNP in the developing countries.

Various functional formats incorporating the above factors were used to construct a profile of Soviet exports to and imports from two samples of developing countries in 1975: (1) all developing countries that reported trade with the USSR, using IMF statistics and (2) all LDCs with which the USSR reported trade in 1975, using Soviet statistics.

*The level of Soviet exports to individual LDCs was found to be positively related to a country's total imports, whether it had a "socialist orientation," and whether it had a soft currency clearing agreement with the USSR.* Soviet exports were also found to be negatively related to distance from the USSR and to the trading partner's per capita GNP. Curiously, Soviet exports were also negatively but weakly related to an index of complementarity. 25X1

*On the import side, Soviet trade was found to be a positive function of: (1) complementarity; (2) the trade partner's total exports; and (3) whether there was a soft currency clearing agreement between the two countries.* Soviet imports were negatively related to distance and unrelated to either "socialist orientation" or per capita GNP level. 25X1

For both exports and imports, the differences in these explanatory variables across countries explained in each case from 60 to 80 percent of the total variation in trade levels. The import and export equations tend to confirm that even the pattern of civilian exports to LDCs is more heavily influenced by political factors—as shown in the correlations with "socialist orientation" and per capita income and the lack of correlation with the complementarity index—than is the pattern of Soviet imports from the developing world. (See appendix D for more detailed information on the methodology and statistical results.) 25X1 25X1

**Price Discrimination in Soviet Trade With the Developing Countries**

Price discrimination by the USSR in its trade with the developing countries is plausible for two basic reasons. First, the Soviets might offer preferential prices to selected LDCs considered to be political and/or military allies. The existence of such price discrimination is supported by the finding of Marrese and Vanous that the pattern of implicit trade subsidies in Soviet trade with the European CEMA members correlates somewhat with their evaluation of the political-strategic importance of these countries to the Soviet Union.[7] Soviet concern with the "economic 25X1

[7] Marrese, M. and Vanous, J., *Soviet Subsidization of Trade With Eastern Europe*, Berkley: Institute of International Studies, University of California, 1983. 25X1

25X1

**Table 4**
**Unweighted Average Soviet Share of Individual Developing Country Exports and Imports, 1970-72 and 1979-81**

*Percent*

| | Soviet Share of LDC Exports | | Soviet Share of LDC Imports | |
|---|---|---|---|---|
| | 1970-72 | 1979-81 | 1970-72 | 1979-81 |
| Afghanistan | 35.3 | 20.8 [b] | 29.1 | 25.1 |
| Algeria | 5.5 | 1.1 | 3.7 | 0.9 |
| Angola | | NA | | NA |
| Argentina | 1.5 | 15.8 | 0.2 | 0.2 |
| The Bahamas | NA | | NA | 0.2 |
| Bangladesh | 4.7 [a] | 5.8 | | 1.7 |
| Barbados | | | | 0.1 |
| Benin | 0.9 | | 1.1 | 0.1 |
| Bolivia | 0.5 | NA | NA | NA |
| Brazil | 1.4 | 1.7 | 0.1 | 0.1 |
| Burkina | | | 0.1 | 0.4 |
| Burma | 1.4 | 1.1 | 2.6 | 0.1 |
| Burundi | | 0.1 | | |
| Cameroon | 2.4 | 0.8 | 0.3 | 0.5 |
| Central African Republic | 0.2 | | 0.2 | |
| Chile | 0.3 | | 0.2 | |
| Colombia | 0.1 | 0.3 | 0.2 | 0.3 |
| Congo | 1.4 | | 0.2 | 0.3 |
| Costa Rica | 1.6 | 0.1 | | 0.1 |
| Cyprus | 5.3 | 3.3 | 2.9 | 3.6 |
| Dominican Republic | | 0.2 | | 0.1 |
| Ecuador | 0.7 | 0.2 | | 0.2 |
| Egypt | 37.6 | 5.4 | 12.8 | 2.1 |
| El Salvador | | | | |
| Equitorial Guinea | | | | |
| Ethiopia | 1.4 | 8.4 | 1.0 | 12.6 |
| The Gambia | | | 1.9 | 1.9 |
| Ghana | 6.4 | 7.2 | 3.5 | NA |
| Guinea | NA | NA | NA | NA |
| Guinea-Bissau | | | | 6.6 |
| Guyana | 2.3 | 1.1 | 0.4 | |
| Hong Kong | | 0.1 | 0.3 | 0.2 |
| India | 14.0 | 6.0 | 8.0 | 7.4 |
| Indonesia | 1.1 | 0.3 | 0.7 | 0.2 |
| Iran | NA | NA [c] | 3.0 | 4.4 |
| Iraq | 0.3 | NA | 10.1 | NA [c] |
| Ivory Coast | 1.2 | 2.0 | | 0.9 |
| Jamaica | 0.5 | 3.5 | | |
| Jordan | | | 2.0 | 0.7 |
| Kenya | 0.3 | 0.4 | 0.3 | 0.1 |
| Kuwait | | | 1.1 | 0.2 |
| Lebanon | 1.3 | 2.1 | 2.4 | 0.7 |
| Liberia | | 0.2 | 0.3 | 0.1 |
| Libya | 0.5 | NA | 11.3 | 0.4 [b] |
| Macau | | 0.3 | | |

**Table 4**
**Unweighted Average Soviet Share of Individual Developing Country Exports and Imports, 1970-72 and 1979-81 (continued)**

*Percent*

| | Soviet Share of LDC Exports | | Soviet Share of LDC Imports | |
|---|---|---|---|---|
| | 1970-72 | 1979-81 | 1970-72 | 1979-81 |
| Madagascar | | 0.8 | | 0.5 |
| Malaysia | 3.1 | 2.3 | 0.2 | 0.2 |
| Mali | 1.4 | 1.0 | 6.2 | |
| Malta | | | 1.3 | 0.3 |
| Mauritania | | | 0.3 | 0.1 |
| Mauritius | 0.1 | 0.1 | | 0.2 |
| Mexico | | | | |
| Morocco | 3.4 | 4.9 | 4.3 | 1.9 |
| Mozambique | | NA | | NA |
| Nepal | NA | NA | NA | NA |
| Nigeria | 0.2 | | 0.8 | 0.3 |
| Pakistan | 4.6 | 2.0 | 2.4 | 0.1 |
| Panama | | | | 0.1 |
| Papua New Guinea | | 0.5 | | |
| Peru | 0.2 | 0.7 | 0.1 | 0.8 |
| Philippines | | 2.5 | | 0.2 |
| Qatar | | | 0.1 | 0.1 |
| Rwanda | | | 0.6 | 0.9 |
| Saudi Arabia | | | 0.7 | 0.2 |
| Senegal | | 0.4 | 0.4 | |
| Sierra Leone | | | 1.3 | [b] |
| Singapore | 2.3 | 1.1 | 0.4 | 0.1 |
| Somalia | 4.2 | | 7.6 | |
| Sri Lanka | 4.1 | 2.9 | 2.0 | 0.4 |
| Sudan | 10.7 | 5.7 | 6.3 | 0.1 |
| Suriname | 0.4 | 0.2 | 0.3 | 0.2 |
| Syria | 14.7 | 5.6 | 7.1 | NA [c] |
| Tanzania | 0.4 | 2.2 | 0.3 | 0.1 |
| Thailand | 0.4 | 2.7 | 0.4 | 0.1 |
| Togo | 8.8 | 0.2 | 2.3 | 0.8 |
| Tunisia | 2.6 | 0.1 | 1.2 | 0.7 |
| Turkey | 4.9 | 5.2 | 6.1 | 2.1 |
| Uganda | 0.4 | | 1.7 | |
| United Arab Emirates | | | 0.8 | 0.1 |
| Uruguay | 0.9 | 3.8 | 0.6 | 0.2 |
| Virgin Islands | | NA | 0.3 | NA |
| Western Samoa | | | 0.5 | |
| North Yemen | 16.5 | | 7.7 | 0.9 |
| South Yemen | | | 1.6 | 0.9 [b] |
| Zambia | | 0.6 | | 0.1 |

[a] 1972 only.
[b] Percentage shares are probably understated because the IMF extrapolates data when information is incomplete.
[c] Reported as NA ("Not Available") here because available figure is clearly of the wrong order of magnitude.

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burden" of Moscow's "extended empire" in the Third World, including Cuba, Vietnam, Ethiopia, and Afghanistan, is based in part on the presumption of price discrimination in favor of these countries.

A second basis for Soviet price discrimination is the existence of bilateral clearing agreements with LDCs that account for roughly one-half of identified Soviet trade with the "nonsocialist" developing world. Although the number of developing countries with which the USSR trades predominantly on a soft currency basis has declined in recent years, many of its main LDC trade partners still deal with the Soviets in this way. The monopoly power conferred to the USSR and other large state-trading countries, which gives them potential power to exercise price discrimination against smaller partners, was pointed out 40 years ago by such prominent international trade theorists as Jacob Viner and Howard Ellis. The USSR, however, might also use such agreements to trade with certain countries at prices more favorable to them than the prices obtainable on the world market. This might explain why some LDCs have clung tenaciously to these agreements while others have let them lapse.

**Data and Methodology**

Significant data and methodological problems were encountered in examining the issue of price discrimination. The proportion of trade for which quantities are reported and for which unit values can be calculated fell sharply after 1975.

A second problem common to any study that relies on reported foreign trade values and quantities to calculate unit values is the possibility—and indeed the probability—that the commodities traded with different countries under a given commodity position, such as a Communist Trade Nomenclature (CTN) number, are not homogeneous. Much of Soviet trade with the LDCs consists of primary products and intermediates, however, and Soviet trade in consumer manufactures with the LDCs is unlikely to feature significant heterogeneity within commodity groups across countries. Consequently, there is little problem of heterogeneity within product groups CTN 2 to 9, with the exception of CTN 21 and 22—trade in petroleum and petroleum products. CTN 1 covers machinery and equipment. The study addressed this problem by calculating separate price discrimination indexes for: (1) all commodities; (2) all commodities except petroleum and petroleum products; and (3) all commodities except petroleum, petroleum products, and machinery and equipment. 25X1

A third problem stressed by Marrese and Vanous is the tendency to focus simply on export and import prices. The full measure of the importance of price discrimination, in terms of the net implicit trade subsidy involved, is obtained by weighting each price differential by the quantities actually traded. Therefore, the study took into account both prices and quantities for both exports and imports. 25X1

Finally, there is the issue of benchmark prices. The measurement of the implicit trade subsidy requires a search for some common opportunity cost basis. Marrese and Vanous used actual, or in many cases "constructed," East-West trade prices as their measure of the alternative prices that the Soviet Union could receive for its exports or that it would have to pay for its imports. A different measure of price discrimination was developed because: (1) there is general skepticism of such constructed prices, especially for machinery and equipment; (2) much of Soviet-LDC trade may be even less homogeneous than is Soviet/East European trade relative to Soviet trade with the West; and (3) interest centers primarily on the pattern of possible Soviet price discrimination among the developing countries. 25X1

Specifically, Soviet price discrimination was examined among the group of LDCs that includes the three non-European members of CEMA (Cuba, Mongolia, and Vietnam) and three other LDCs classified as "socialist" in Soviet foreign trade statistics (China, Laos, and North Korea). The benchmark used was the weighted average price at which each commodity is traded in Soviet-LDC trade. The resulting net relative measure of implicit trade subsidies that is calculated for each Soviet LDC trade partner has the theoretically appealing property that the sum of all such country subsidies is equal to zero. These implicit trade subsidies were calculated for each LDC for 1970, 1975, and 1980. (See appendix E for a more detailed description of the methodology used to calculate price discrimination.) 25X1

**Results**

Only three somewhat consistent patterns of Soviet relative price discrimination emerged in the study. *First, relative price discrimination in favor of the three LDC members of CEMA was apparent* in 1980 in terms of trade-normalized relative trade subsidies and for all three years—1970, 1975, and 1980—when these relative subsidies were measured against trading partners' population or GNP. *Second, relative price discrimination against soft currency clearing agreement trade partners was apparent* in 1970 and 1975, particularly in terms of trade-normalized relative subsidies. *Third, countries with a "socialist orientation" appeared to be systematically discriminated against* in 1975 on the basis of trade-normalized relative trade subsidies.

This evidence of relative price discrimination in favor of CEMA members and against socialist-oriented and soft currency trade partners may be provisionally interpreted as follows. The Soviet Union would appear to be price discriminating in favor of LDC members of CEMA, perhaps increasingly over time. This discrimination probably results from a combination of political factors and the inertia built into the intra-CEMA foreign trade price system. It conforms both to anecdotal accounts and to conventional calculations of trade subsidies to Cuba in sugar and oil and also is consistent with the Marrese and Vanous perception of massive absolute implicit trade subsidies in Soviet trade with the European members of CEMA.

In the past the Soviet Union may have systematically discriminated against the socialist-oriented and soft currency countries. Given the presumed "socialist orientation" of the first group and the close Soviet political relationship with members of the second group—for example, Afghanistan, India, and Syria—it is difficult to believe that this discrimination was the conscious result of political factors. A more plausible explanation might be that historically these countries have encountered greater difficulties, for a variety of reasons, in gaining access to world markets at favorable prices than have the oil-exporting countries or "all other" developing countries. (The latter group is composed mainly of Southeast Asian newly industrialized countries [NICs] and a number of Latin American and African exporters of minerals and foodstuffs.) The Soviets may be forced to trade primarily at world market prices with the NICs. Soviet trade with the socialist-oriented and soft currency countries, on the other hand, may systematically enable the USSR to command higher export and lower import prices. In effect, the USSR may have considerable bilateral bargaining power with these countries, and this may be reinforced by the strongly bilateral nature of their trading relationships. 25X1

If indeed the Soviets have tended to discriminate against their soft currency clearing partners, one may wonder why these countries might continue to press the USSR to maintain these agreements, as Soviet analysts claim. Two qualifications should be noted, however, to the findings. First, there is no econometric evidence that either the socialist-oriented or the soft currency countries were still being systematically discriminated against in 1980. Second, soft currency agreements have been terminated with several LDCs since 1975. This could have represented LDC response to perceived price discrimination against them. 25X1 25X1

*On balance, the pattern of Soviet relative price discrimination that emerged in identified trade was not always clear and not particularly consistent across the three years examined.* Furthermore, an econometric analysis of the determinants of the pattern of relative subsidization across countries was not very successful. One possible reason for this lack of success may be that the proxies for political and economic explanatory factors, usually in the form of country group dummy variables, were simply not precise enough and failed to differentiate adequately among individual developing countries. 25X1 25X1

Another possibility is that, despite efforts to achieve commodity homogeneity across countries, significant heterogeneity remains. Large measured price differentials may have been simply the result of such heterogeneity and not price discrimination. Differences in timing of Soviet imports in the course of a given year could also explain many observed price differentials across countries, particularly in the case of primary products such as sugar. Both product heterogeneity and timing differences could be seen as significant random elements that may have negated most of the impact of political and market-structure determinants on Soviet price discrimination. 25X1

**Growth and Stability of Soviet Imports of Primary Products**

The Soviets have long claimed that the USSR, and the "socialist" countries more generally, represent relatively fast-growing and stable markets for the primary product exports of the developing countries. This was a common assertion in Soviet writings of the 1950s and 1960s, and it was frequently voiced in the United Nations Conference on Trade and Development (UNCTAD) forums in the 1970s.

**Previous Investigations**

In terms of methodology and product coverage, the contract research replicates earlier work of Egon Neuberger, who examined these issues for 1955-61, and of Philip Hanson, whose study focused on 1960-68.[8] Soviet imports during 1960-81 were examined, as well as in the two subperiods, 1960-70 and 1971-81.

Comparing the Soviet Union with a group of Western countries for the late 1950s, Neuberger found that the USSR was a relatively small market for LDC exports of primary products. Perhaps for that very reason, the Soviet Union was a relatively rapidly growing market as well as a relatively unstable one in terms of annual fluctuations of unit values and LDC export revenue. Hanson found that, during 1960-70, the USSR was still a relatively fast-growing market for LDC exports compared with certain Western countries but that its "margin of superiority" in this respect was "not very great." Soviet imports, in terms of both volume and value, were still relatively unstable, but Hanson argued that the instability was not significant. Hanson concluded that the evidence "hardly seems to support the view that there is a substantial and interesting difference between the two kinds of economic systems (Soviet type versus market type) as importers of primary products in the stability of their import flows, as conventionally measured."

[8] Neuberger, Egon, "Is the USSR Superior to the West as a Market for Primary Products?", *Review of Economics and Statistics*, vol. 46, 1964. Hanson, Philip, "The Size, Growth, and Stability of the Soviet Market for Primary Products," *Jahrbuch der Wirtschaft Osteuropas*, Band 3, 1972.

**Data and Procedures**

The so-called core commodities included in the UNCTAD Integrated Program for Commodities were used as the basis for product selection. The stabilization of sales of these commodities is of particular interest to the developing countries. The commodity coverage of this study is compared with the UNCTAD list and those of the earlier Neuberger and Hanson studies. 25X1

Consistent and comprehensive 1960-81 trade data for the Soviet Union and the three main Western trading nations—West Germany, Japan, and the United States—were available in trade statistics published by the Food and Agriculture Organization of the United Nations (FAO) for seven of the 10 UNCTAD "core" commodities: raw sugar, coffee, cocoa beans, tea, natural rubber, raw cotton, and jute. Also analyzed were rice and tobacco, two other commodities originally examined by Neuberger and for which consistent and comprehensive FAO data were available. Developing countries account for a majority of world exports in most of these products and for more than 95 percent of world exports in four of the commodities. 25X1 25X1 25X1

**Results**

The Soviet Union accounted for only 16.7 percent of combined four-country—United States, West Germany, Japan, USSR—imports of the nine sampled primary products during 1960-70. In terms of the sum of individual size-of-market rankings by product, the USSR ranked third after the United States and West Germany. During 1971-81, however, Soviet imports amounted to 23.2 percent of combined imports, and the USSR was tied for first place with the United States in terms of the sum of individual size-of-market rankings by product. 25X1

The study found that the Soviet Union ranked second among the four countries examined in terms of real growth of primary product imports over the entire period. In the 1970s the USSR narrowed the lead of first-place Japan in this regard, and, for that decade as well as the entire 1960-81 period, the Soviet 25X1 25X1

**Table 5**
**Estimated Average Annual Growth Rates of Selected Real Raw Material Imports From Developing Countries, 1960-81**

*Percent*

| | United States | | West Germany | | Japan | | Soviet Union | |
|---|---|---|---|---|---|---|---|---|
| | 1960-70 | 1971-81 | 1960-70 | 1971-81 | 1960-70 | 1971-81 | 1960-70 | 1971-81 |
| Rice | | −25.9 | | | | 12.0 | | 15.1 |
| Sugar | 2.1 | | | −9.5 | 6.5 | −2.2 | | 10.4 |
| Coffee | −1.0 | −2.3 | 4.4 | 4.5 | 19.3 | 7.6 | 5.8 | |
| Cocoa | | −5.0 | | 1.3 | 9.8 | −4.3 | 11.0 | |
| Tea | 2.4 | | 2.7 | 6.1 | 21.5 | −2.3 | 4.1 | 5.1 |
| Tobacco | 5.0 | 4.5 | 3.7 | | 14.0 | 4.0 | | |
| Rubber | 3.9 | | 2.9 | −1.0 | 5.7 | 3.0 | | −2.2 |
| Cotton | −11.5 | −20.6 | −2.3 | 3.5 | | −1.4 | | −18.2 |
| Jute | −13.7 | | 5.0 | −15.7 | 4.7 | −14.8 | 5.9 | 6.4 |
| Sum of rankings | 28.0 | 27.0 | 26.5 | 23.5 | 14.0 | 19.0 | 21.5 | 20.5 |
| Overall ranking | 4.0 | 4.0 | 3.0 | 3.0 | 1.0 | 1.0 | 2.0 | 2.0 |

[a] Estimated growth rates are only shown if they are statistically significantly different from zero at least at the 20-percent level.

25X1

market grew more rapidly than that of the median Western country. As shown in table 5, during this period Soviet real imports grew at relatively high rates for rice (particularly in the 1970s), sugar (1970s), cocoa beans (1960s), and jute (1960s and 1970s).

25X1

Weak evidence was found suggesting that Soviet real imports of primary products were relatively variable compared with those of median Western importing countries in 1960-81.[9] Although the USSR ranked last in terms of variability of real imports in the 1970s, the differences in this case were not great enough to be statistically significant. Soviet imports became absolutely less variable in terms of the measured stability indexes for six of the nine products during the 1960s and 1970s.

25X1

[9] The measure for stability of the volume imports, unit values, and total import values in the study was the modified coefficient of variation index used in the Neuberger and Hanson studies. The coefficient of variation was modified so that the standard deviation was calculated with respect to the estimated trend, rather than the mean value of import volume, unit value, and total import value, respectively. The rankings and statistical significance of the results were essentially the same regardless of whether linear or nonlinear estimating techniques were used or the rankings were weighted by relative import values.

The slightly reduced relative variability of Soviet unit values in the 1970s appears to explain the diminished relative variability of Soviet total import values in this decade. Soviet import values were significantly more variable than those of the median Western country in the 1960s, but since then they have not been significantly more variable than the Western median.

25X1

No systematic relationship was found between stability indexes and the average values of import volumes, unit values, or total trade values, respectively. The empirical results, therefore, suggest that the explanation for any apparent Soviet variability probably lays in differences in the Soviet foreign trade system and/or Soviet foreign trade policies and not in market size differences.

25X1

In sum, *examination of more than 20 years of Soviet imports of primary products suggests some slight relative improvement in the stability of the prices the USSR pays for LDC exports, although it still must be considered as essentially no different from that of the Western market economies.* The volumes of Soviet

25X1

25X1

imports of these products continue to be a bit more variable than those of the median Western country, but they are relatively less variable than before. In the 1970s Soviet import volumes could not be considered to be more variable than the real imports of the median market economy. The net result of these trends in relative variability of Soviet real imports and import prices has been to reduce the variability of Soviet import values from clearly above average in the 1960s to essentially average levels in the past decade. Thus, the stability of Soviet import behavior (prices, volume, and value) with respect to primary products is now more similar to that of the major Western trading countries than it was in the 1960s.

## The Role of Bilateral Clearing Agreements

The importance of bilateral clearing agreements in explaining Soviet trade patterns with developing countries was also assessed. This is comparable to asking whether bilateral clearing agreements serve a useful purpose, because such agreements presumably are valued at least partly for the effect that they are perceived to have on trade.

### Sample

The sample distinguished between the USSR's soft currency (SC) and hard currency (HC) developing country trade partners. The distinction referred to the difference between hard and soft currency LDC trade partners of the USSR. Although the soft currency trade partners maintain bilateral clearing agreements with the Soviet Union, it was neither assumed that all Soviet trade with these countries was transacted through the formal clearing mechanisms, nor that all trade with supposedly HC trade partners was settled in convertible currencies.

The SC trade partners considered in this study are the same as those identified previously. As mentioned in that discussion, the number of SC partners has declined since the early 1970s. For the most part, therefore, the study focused on the 10 "core" nonsocialist (Soviet definition) SC countries, namely those developing countries that apparently still maintained bilateral clearing agreements with the Soviet Union as of 1980.[10] According to Soviet sources, by 1983 this core group had been further reduced to just six countries: Afghanistan, India, Iran, Pakistan, Syria, and Egypt.[11] The study does not include the six "socialist" LDC trade partners—Cuba, Mongolia, Vietnam, Laos, North Korea, and China—each of which is commonly believed to do business with the USSR on the basis of bilateral clearing agreements. These countries were excluded to isolate the marginal effect of bilateral clearing agreements on Soviet trade with countries that do not have centrally planned economies. 25X1

### Hypotheses Tested 25X1

The report was organized around six plausible explanations, none mutually exclusive, for the existence of bilateral clearing agreements between certain developing countries and the Soviet Union. In all but one case, these explanations were tested and the empirical results used as a basis for judging the relative persuasiveness of these different arguments. While the impact of bilateral clearing agreements per se on Soviet-LDC trade flows could not be isolated, it was possible to demonstrate that Soviet trade with countries having bilateral clearing agreements with the USSR is different in some fundamental respects from Soviet trade with other developing countries. 25X1 25X1

The first explanation explored was the traditional rationale for bilateral clearing agreements: they represent a second-best way for countries with exchange controls to push trade, and presumably economic welfare, above the levels that would be possible if all trade were conducted on a convertible currency basis. The cross-section regressions for 1975 from the report indicated that LDC trade levels with the Soviet Union were higher for SC trading partners. Whether the clearing agreements were responsible for the higher levels of trade, however, was not clear. Furthermore, 25X1 although roughly half of the HC exporters to the Soviet Union in 1980 were reported by the IMF as

[10] Afghanistan, Bangladesh, India, Iran, Pakistan, Syria, Turkey, Egypt, Guinea, and Morocco. 25X1

[11] The Annual Report on Exchange Restrictions for 1983, published by the International Monetary Fund, indicates that Bangladesh continues to maintain a bilateral clearing account with the USSR. 25X1

maintaining "restrictions on payments for current transactions," all of the SC trade partners of the Soviet Union were so designated.

The finding for the SC countries is consistent with the trade expansion argument, but the question remains why the other exchange control countries did not have bilateral clearing agreements with the Soviet Union. Moreover, the countries that no longer had clearing agreements with the USSR during 1970-83 were not reported by the IMF as having eliminated the exchange controls. It should be noted, however, that the IMF designations are very rough and probably cannot be used to measure precisely the relative severity of exchange controls across countries.

An implicit assumption that often seems to underlie the second-best argument for bilateral clearing agreements is that the signatory countries have a range of exportables that fall into the category of "soft goods" in Soviet–East European parlance. Considering machinery and equipment and manufactured consumer goods to be the preeminent soft goods, in 1980 the SC trade partners of the USSR had an above-average proportion of "soft goods" in their exports to the Soviet Union. Taken together, these rather crude empirical measures do provide some support for the trade expansion argument, but the evidence is certainly nothing more than indicative.

A related argument would be that bilateral clearing agreements facilitate LDC export diversification, which might be a policy objective of some developing countries. By two measures of export diversification, SC exports to the Soviet Union in 1980 were significantly more diversified than those of equally large HC exporters to the USSR. It could not be shown that the clearing agreements encouraged this greater diversification, but the correlation is very suggestive. Relative export diversification does not appear to be a good predictor, however, of whether clearing agreements will be allowed to lapse.

Another attraction of bilateral clearing agreements to developing countries might be the perception that LDC exports to the Soviet market will grow more rapidly if they are paid for on a soft currency clearing basis. Neither overall trends in Soviet imports in the latter half of the 1970s, however, nor detailed comparisons for 1965-77 for individual countries yield any evidence that clearing agreements facilitate the growth in exports to the USSR. 25X1

The possibility that developing countries having bilateral clearing agreements with the Soviet Union might obtain better terms of trade was also examined. The SC trading partners as a group actually suffered a deterioration in their terms of trade with the USSR in the 1970s, and the HC group's terms of trade improved. Price trends in Soviet petroleum trade obviously played a big role in this divergence, while clearing agreements probably had little influence. 25X1

As discussed earlier, no evidence could be found of Soviet price discrimination in favor of the SC countries. On the contrary, some weak evidence was found of price discrimination against this group of countries in 1970 and 1975 but not in 1980. This finding of possible relative price discrimination against the SC countries does not rule out the possibility that: (1) the USSR provided absolute Soviet implicit trade subsidies to these countries, using average world market prices as a benchmark; (2) the SC group might have obtained better prices in trade with the Soviets than they could actually get on the world market for their marginal deliveries (purchases); or (3) prices in trade with the USSR are more predictable, if not actually more favorable on average, in the context of bilateral trade agreements than those available on the world market. 25X1 25X1

The Soviet Union might have used its bilateral monopoly power with clearing agreement partners to obtain favorable prices for itself, while the partners received benefits in terms of trade expansion, diversification, and stability. As noted previously, however, any systematic relative price discrimination against SC countries may have had less to do with the clearing agreements than with the greater difficulty that these countries have had in gaining access to world markets, compared with oil-exporting countries, the NICs, and various Latin American and African exporters of minerals and foodstuffs. 25X1 25X1

Finally, the argument that clearing agreements foster stability in LDC exports was investigated. As it turned out, the SC countries as a group experienced about the same degree of instability in export unit values and in the volume and value of trade with the USSR during 1975-81 as did the HC group in the aggregate. [12]

A more refined test of instability was made for 1965-77 using calculated "fluctuation indexes" for individual SC and HC country exports, respectively, to the Soviet and world markets. The results of this test point to the stabilizing benefits of clearing agreements. The mean fluctuation indexes for the two country groups for nominal exports to the world market were virtually identical. HC exports to the Soviet market were more than twice as unstable, according to this index, than were HC country exports to the world. This is not surprising, given the much greater size of overall exports of these countries to the world at large. More surprising was that SC exports to the Soviet market were less than half as unstable as SC exports to the larger world market. In both of these two comparisons, the mean fluctuation indexes were statistically significantly different.

**Summary**

Strong evidence was found that, when compared with LDCs that do not have bilateral clearing agreements with the USSR, those LDCs that do have such agreements: (1) are more likely to have exchange controls; (2) trade more with the Soviets; (3) have a relatively high proportion of "soft goods" in their exports to the USSR; (4) have more diverse export structures in trade with the Soviet Union; and (5) have a record of greater stability of exports to the Soviet market, both compared with the HC group's exports to the USSR and, more importantly, compared with SC exports to the larger world market.

The first three findings tend to support the conventional trade expansion explanation for clearing agreements as a second-best policy of promoting economic welfare through expanded trade in the presence of exchange controls. The next two, which deal with the diversity and stability of LDC exports to the USSR, may be related and provide plausible and empirically persuasive reasons for these countries to have entered into and/or to have clung to bilateral clearing agreements with the Soviets.

25X1

No evidence has been found: (1) that LDCs with bilateral clearing agreements with the USSR have received preferential prices in trade with the Soviet Union compared with the prices available to the USSR's HC trade partners among the LDCs; or (2) that the clearing agreements have facilitated faster growth of LDC exports to the Soviet Union. Unfortunately, no relatively low-cost way could be found to test the trade predictability argument for clearing agreements. Although there are positive correlations between the existence of bilateral clearing agreements and the volume of LDC exports to the USSR, the diversity and stability of these exports, and the proportion of soft goods in the exports, we cannot be certain that the existence of bilateral clearing agreements explains these results in every case. Moreover, we have not found a correlation between changes in these measures and the termination of clearing agreements with the Soviet Union.

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[12] The measure in this case was the aggregate coefficient of variation calculated over six years for each country group.

25X1

# Appendix A

## Methodology for Calculating Price and Quantity Indexes

### Paasche Unit-Value Indexes

Paasche unit value (hereafter referred to as "price") indexes for Soviet trade with the developing countries were chosen for two reasons. First, there was an overriding need to select indexes that were methodologically congruent with the quantity indexes employed in official Soviet foreign trade statistical publications. This would permit the use of results in conjunction with Soviet-produced indexes for certain analytical purposes. [redacted] 25X1

Second, although ideally the construction of both Paasche and Laspeyres indexes would be desirable for purposes of delimiting export and import prices and real trade trends, the highly labor-intensive nature of the project precluded calculation of both types of index—that is, all data had to be extracted from statistical publications, and disaggregated price index calculations were done by hand. While using just one index may give biased estimates of price and real trade movements, this problem is probably only potentially significant for the 1971-75 subperiod. [redacted] 25X1

Overall Paasche price indexes were calculated for both exports and imports. The overall index for period t relative to some base period, o, is defined as:

$$P_{t(o)} = \frac{\sum_h \sum_j P^t_{hj} Q^t_{hj}}{\sum_h \sum_j P^o_{hj} Q^t_{hj}} \qquad (1)$$

where $P_{t(o)}$ is the overall Paasche price index, $P_{hj}$, and $Q_{hj}$ refers to the unit value and quantity, respectively, of the $h^{th}$ commodity traded with the $j^{th}$ country, and superscripts t and o refer to the current and base periods, respectively. Expression (1) may be rewritten as:

$$P_{t(o)} = \frac{1}{\sum_j \lambda^t_j \left( \sum_i \frac{\lambda^t_{ij}}{P^{ij}_{t(o)}} \right)} \qquad (2)$$

where $P^{ij}_{t(o)}$ is the Paasche price index for commodity group i traded with country j, $\lambda^t_{ij}$ is the value weight for commodity group i in total trade with j in period t, $\lambda_j$ is the value weight for country j in total Soviet trade with LDCs in period t, and $1/\sum_i (\lambda^t_{ij}/P^{ij}_{t(o)})$ would be the Paasche price index for total trade with country j in period t, or $P^j_{t(o)}$. [redacted] 25X1

### Aggregation of Price Indexes

25X1

Individual nonresidual commodity group Paasche price indexes for each country were first aggregated into a single country index according to expression (3):

$$P^j_{t(o)} = \frac{1}{\sum_i \left( \frac{\lambda^t_{ij}}{P^{ij}_{t(o)}} \right)} \qquad (3)$$

Only if the utilized unit value *sample* for CTN 3 to 9 accounted for more than 25 percent of a country's *total identified* CTN 3-9 exports (imports) were commodities in this group included in this aggregation stage. Except for 1975/71 index, the exclusion of some countries' CTN 3 to 9 trade on this criterion had little impact on the aggregate value of "utilized" trade. For both exports and imports the total value of utilized trade always exceeded 96 percent of the total value of identified trade after 1975. [redacted] 25X1 25X1

The second aggregation stage involved aggregating these country indexes in accordance with expression (2). For exports, two aggregate price indexes were derived: one for "identified" exports (I), constructed as above, and one for residual exports (R). The overall export price index was then calculated according to expression (4):

$$P_{t(o)} = \frac{1}{\lambda_I \sum_j \left( \frac{\lambda_j}{P^j_{t(o)}} \right) + \frac{\lambda_R}{P^R_{t(o)}}} \qquad (4)$$

where $\lambda_I$ and $\lambda_R$ are the value weights for total identified and total residual exports, respectively, and $P^R_{t(o)}$ is the assumed price index for residual exports.

25X1

**Derivation of Laspeyres Quantity Indexes and the Terms of Trade**

The Laspeyres, or base-year weighted quantity index, is equal to the value index ($V_{t(o)}$) divided by the Paasche price index:

$$Q_{t(o)} = \frac{V_{t(o)}}{P_{t(o)}} = \frac{\Sigma \Sigma P^o_{hj} Q^t_{hj}}{\Sigma \Sigma P^o_{hj} Q^o_{hj}} \quad (5)$$

The Laspeyres quantity index for "identified" exports was derived by dividing the value index for total identified exports by the Paasche price index constructed for all "utilized" identified exports. The latter amounted to between 97.7 and 99.9 percent of total identified exports between 1976 and 1981. The quantity index for residual exports was derived by dividing the value index for total residual exports by the synthetic index for this commodity category. The quantity index for total exports was obtained by dividing the value index for total exports by the overall Paasche price index calculated according to expression (5).

25X1

Finally, the quantity index for imports was derived by dividing the value index for total imports by the constructed overall Paasche import price index. A separate price index for residual imports was not constructed because they have tended to be small (typically less than 10 percent) relative to total imports. By applying the constructed price index for "identified" imports to the total value of imports, it was assumed that basic price developments for the import residual approximated price trends for the identified component. The Soviet net barter terms-of-trade index is simply the overall export price index divided by the overall import price index.

25X1

**Derivation of Quantity, Price, and Terms-of-Trade Indexes for Soviet Trade With the Industrialized West**

Aggregate linked Soviet price indexes for LDC trade in each period were used in conjunction with the official Soviet linked Laspeyres quantity indexes for the same trade periods with all "nonsocialist" countries to derive Soviet price, quantity, and terms-of-trade indexes for trade with the industrialized developed capitalist countries (the West). Specifically, Paasche price indexes for exports to and imports from the West were derived using expression (6):

$$P^W_{t(o)} = \frac{1}{\frac{1}{\lambda_W}\left(\frac{1}{P_{t(o)}} - \frac{\lambda_L}{P^L_{t(o)}}\right)} \quad (6)$$

where $P^W_{t(o)}$, $P^L_{t(o)}$, and $P_{t(o)}$ are the rolling aggregate Paasche price indexes for Soviet trade with the West, the LDCs, and all nonsocialist countries, respectively, in total Soviet trade with the nonsocialist world. On the right-hand side of (6), $\lambda_w$ and $\lambda_L$ are easily calculated, $P^L_{t(o)}$ is the overall price index calculated for the LDCs, and $P_{t(o)}$ is derived by dividing the value index for total Soviet exports to (imports from) the nonsocialist world by the published Soviet Laspeyres quantity index for exports (imports) with that region.

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# Appendix B

## The Socialist-Oriented LDCs

| Client States [a] | Other Socialist-Oriented LDCs [b] |
|---|---|
| Afghanistan | Algeria |
| Angola | Benin |
| Cambodia | Burma |
| Ethiopia | Cape Verde |
| Mozambique | Congo |
| South Yemen | Grenada |
| | Guinea |
| | Guinea-Bissau |
| | Madagascar |
| | Nicaragua |
| | Somalia |
| | Syria |
| | Tanzania |

[a] Defined as an "Other Developing Client," according to the NATO definition, with the exception of Cambodia, which is defined as a "Communist Developing Country."
[b] Includes other LDCs, which have been characterized as having a Marxist regime and/or a "socialist orientation" by one or more Soviet writers.

25X1

# Appendix C

## USSR: Soft and Hard Currency LDC Trading Partners

| Soft Currency Clearing Agreement Through 1981 | |
|---|---|
| Afghanistan | Egypt |
| Bangladesh | Guinea (at least through 1980) |
| Cambodia | Morocco (through 1981) |
| India | Somalia |
| Iran | |
| Pakistan | |
| Syria | |
| Turkey (through 1982) | |

| Soft Currency Clearing Agreement for Part of the 1970s | |
|---|---|
| Cyprus (through 1976) | Algeria (through 1979) |
| Nepal [a] (through 1975) | Ghana (through 1975) |
| Sri Lanka (through 1976) | Mali (through 1977) |
| Tunisia (through 1973) | |

| Hard Currency Developing Country Trade Partners Throughout the 1970s | | |
|---|---|---|
| Africa | Latin America | Asia and Middle East |
| Angola | Argentina | Burma |
| Benin | Bolivia | Hong Kong |
| Burkina | Brazil | Indonesia |
| Burundi | Chile | Iraq |
| Cameroon | Colombia | Israel |
| Cape Verde Islands | Costa Rica | Jordan |
| Central African Republic | Dominican Republic | Kuwait |
| Congo | Ecuador | Lebanon |
| Ethiopia | El Salvador | Macau |
| Equatorial Guinea | Guatemala | Malaysia |
| Gabon | Guyana | Philippines |
| The Gambia | Honduras | Saudi Arabia |
| Guinea-Bissau | Jamaica | Singapore |
| Ivory Coast | Mexico | Thailand |
| Kenya | Nicaragua | Yemen, Arab Republic |
| Liberia | Panama | Yemen, People's Democratic |
| Madagascar | Paraguay | Republic |
| Malawi | Peru | |
| Mauritania | Trinidad and Tobago | |
| Mauritius | Uruguay | |
| Mozambique | Venezuela | |
| Niger | | |
| Nigeria | | |
| Rwanda | | |
| Senegal | | |
| Sierra Leone | | |
| Sudan | | |
| Tanzania | | |
| Togo | | |
| Uganda | | |
| Zaire | | |
| Zambia | | |

[a] After the completion of the research for this paper, additional information was discovered indicating that Nepal was a hard currency trading partner throughout the 1970s. Soviet trade with that country has been so small, however, that the quantities reported by country grouping were only negligibly affected by Nepal's inclusion in this group.

25X1

## Appendix D

## Statistical Notes on Calculating the Determinants of Soviet Trade With the LDCs

Ideally, we would like to explain econometrically the development of Soviet trade in different products and with individual developing countries over time. Significant data problems exist for any such effort; however, we will confine ourselves to explaining the level and share of trade with the USSR for individual developing countries in a given year. In effect, this approach asks why some developing countries trade more and others less with the USSR in a given year. Alternatively, it explains the distribution of Soviet trade across individual developing countries.

We have selected 1975 for our cross section analysis, because it falls in the middle of the period examined in this study and because data availability was greatest in that year for the "complementarity" variable that plays such an important role in our specification. Data were available for 1979 as well but for a significantly reduced number of countries.

Each country's exports to (imports from) the USSR and the world in 1975 were taken from IMF, *Direction of Trade Yearbook*. Only countries with reported trade with the Soviet Union were included in the sample. The issue of how to deal with those developing countries with no reported trade with the USSR is a complex one, involving such questions as "selectivity bias."

For each country a complementarity index was calculated in the following manner. The percentage distribution of each LDC's exports to (imports from) the world by five main commodity groups was available from UNCTAD, *Handbook of Trade and Development Statistics, Supplement*. The five commodity groups are food and foodstuffs (SITC 0+1+22+4), ores and metals (SITC 27+28+67+68), fuels (SITC 3), agricultural raw materials (SITC 2-22+27+28), and manufactured products (SITC 5+6+7+8-(67+68)). This percentage for each group and for each country was multiplied by a constant (available from the same source) indicating the Soviet share of world imports from (exports to) the developing countries (as a group) in that commodity group. The products of these two percentages were then summed across all five commodity groups for each country. The greater the sum of those products (a kind of complementarity index), the greater should be Soviet imports from (exports to) a given LDC, *ceteris paribus*.

Distance between individual developing countries and the Soviet Union was intended to be the economic distance. With the exception of trade with Afghanistan, Iraq, and Iran, trade with the LDCs was assumed to take place almost exclusively by ship. And with the exception of one country, to which the closest Soviet port appeared to be Riga, all shipping distances were calculated from Odessa, by the shortest route, either through the Strait of Gibraltar or the Suez Canal. Distances were calculated from a US Naval Oceanographic Office publication (1964).[13]

Countries were defined as "socialist oriented," as of 1975, if they had an established Marxist-Leninist regime before 1 January 1975 (per Szajkowski [1982]) and/or had been considered as having "long had" a "socialist orientation" by Ushakova (1980) by the late 1970s.[14] This is thus a smaller group of countries (10) than the group of socialist-oriented LDCs listed in appendix B. Soft currency countries as of 1975 included those in appendix C, except Tunisia.

The regression equations for exports and imports were separately specified as:

$$V_{js} = f\left(\sum_i (\lambda_{ij}\, \alpha_i)\, V_j, \text{DIST}, \text{SOC}, \text{SOFT}\right) \qquad (1)$$

[13] US Naval Oceanographic Office, *Distance Between Ports*, Washington, D.C.: US GPO, 1964.
[14] Szajkowski, B., *The Establishment of Marxist Regimes*, London: Butterworth, 1982 and Ushakova, N. A, *Strany SEV i razvivayushchiesia gosudartstva sotsialisticheskoi orientatsii*, Moscow: "Nauka," 1980.

where $V_{js}$ is the level of the $j^{th}$ country's exports to (imports from) the USSR, $V_j$ is the country's total exports (imports), $\lambda_{ij}$ is the share of the $i^{th}$ commodity group in $j^{th}$ exports to (imports from) the world, $\alpha_i$ is the Soviet share of world imports from (exports to) the developing countries in the $i^{th}$ commodity group, DIST is a measure of the economic distance between the $j^{th}$ country and the Soviet Union, GNP is $j^{th}$ country GNP per capita, and SOC and SOFT are dummy variables referring to the existence of "socialist orientation" and "soft currency" clearing arrangements respectively. The first righthandside variable $\sum_i(\lambda_{ij}\alpha_i)$ is what we shall refer to as the complementarity variable, or COMPL.

Several different specific functional forms were experimented with. In the case of linear specifications, the intercept was constrained to zero, for clearly if the complementarity index were zero (that is, absolutely no complementarity in trade structures), or if the scale factor in expression (1) were zero, no trade with the $j^{th}$ country and the Soviet Union would be expected. Similar reasoning led us to introduce the SOC and SOFT dummy variables multiplicatively (with COMPL and $V_j$), inasmuch as a dummy variable standing alone would mean allowing shifts in an intercept which had already been constrained to zero. The linear specifications turned out to contain a large heteroscedasticity problem, however, which could not be totally corrected. Consequently, only the log-linear regressions are reported here.

A number of countries had to be eliminated from the sample because of incomplete data for one or more variables. In addition, regression results for two different groups of actual trading partners were obtained. The larger group includes all those countries for which *Direction of Trade* (DoT) reports actual trade with the USSR. The smaller group includes only those countries that are included in official Soviet trade statistics (VTSS). This distinction was made because in some cases the larger group would include countries that were clearly engaging in rather unusual trade with the USSR (for example, Soviet imports from the Virgin Islands, probably consisting of petroleum product transshipments), and their inclusion seemed to be seriously biasing the regression results. Thus the results from equations using the smaller sample may be more reliable indicators of the basic determinants of Soviet trade levels with the LDCs.

The regressions explaining Soviet exports to the developing countries are reported in table D-1. The individual estimating equations explain between 59 and 80 percent of the variation in Soviet exports across countries, with the explanatory power of the equations being somewhat higher (as indicated by the reported adjusted $R^2$) for the smaller sample based on trade partners reported in Soviet trade statistics.

Distance consistently appears with the expected negative sign and an elasticity between $-0.69$ and $-1.10$, with a high degree of statistical significance. This variable is undoubtedly picking up the effect of distance on transaction costs associated with trade, as well as the cultural and geopolitical importance of distance. Holding all else constant, it is logical to expect that the Soviets would make a particular effort in establishing and deepening trade relations with countries that are geographically close to their borders. Indeed, Soviet observers place great stress on this proximity factor (but not necessarily in terms of transaction costs) in explaining the geographical pattern of Soviet trade.

"Socialist orientation" is only statistically significant in one of the equations (see A[1] in table D-1), but in each case it does enter with the expected positive sign. Observe that both the size of the estimated coefficient and its t value fall when we move to the smaller sample. No countries denoted as having a socialist orientation are dropped in changing samples. Rather, the declines noted above appear to be caused by eliminating from the sample a number of non-socialist-oriented countries that also have very low levels of imports from the USSR. In any event, this generally weak but positive relationship between socialist orientation and Soviet exports makes sense if we consider the importance of such countries in the Soviet economic aid program, which is manifested principally in exports of machinery and equipment. (The SOC variable would likely be more significant in explaining Soviet exports in recent years, after the establishment of "socialist" regimes in such countries as Afghanistan, Angola, Mozambique, and Ethiopia.)

Clearly those countries with soft currency clearing agreements with the USSR import more from the Soviets, *ceteris paribus,* but one wonders whether the

**Table D-1**
**Cross-Section Regressions Explaining Soviet Exports to the Developing Countries, 1975**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **A. Trading Partners According to DOT (n = 66)** | | | | | | | |
| (1)[a] $\ln V^m_{js}$ = | −0.32 ln COMPL<br>(0.59) | −0.97 ln DIST<br>(4.07)*** | + 1.45 SOC ln e<br>(1.95)* | + 1.14 $\ln V^m_j$<br>(6.88)*** | | | $\bar{R}^2 = 0.59$ |
| (2) $\ln V^m_{js}$ = | −0.55 ln COMPL<br>(1.11) | −0.69 ln DIST<br>(3.38)*** | + 0.64 SOC ln e<br>(1.02) | + 1.13 $\ln V^m_j$<br>(7.65)*** | + 1.76 SOFT ln e<br>(3.70)*** | −0.56 ln GNP<br>(3.29)*** | $\bar{R}^2 = 0.73$ |
| **B. Trading Partner According to VTSS (n = 52)** | | | | | | | |
| (1) $\ln V^m_{js}$ = | −1.39 ln COMPL<br>(1.92)* | −1.10 ln DIST<br>(3.64)*** | + 0.57 SOC ln e<br>(0.87) | + 0.78 $\ln V^m_j$<br>(4.78)*** | | | $\bar{R}^2 = 0.72$ |
| (2) $\ln V^m_{js}$ = | −0.89 ln COMPL<br>(1.33) | −0.73 ln DIST<br>(2.65)** | + 0.13 SOC ln e<br>(0.24) | + 0.82 $\ln V^m_j$<br>(4.79)*** | + 1.66 SOFT ln e<br>(3.63)*** | −0.29 ln GNP<br>(1.48) | $\bar{R}^2 = 0.80$ |

[a] Statistics in parentheses under estimated coefficients. A ***, **, or * denotes coefficient is statistically significantly different from zero at the 1-percent, 5-percent, or 10-percent levels, respectively.
[b] Reject the hypothesis of no heteroscedasticity at the 5-percent level of significance but cannot reject this hypothesis at the 1-percent level.

25X1

SOFT dummy should really be considered as an independent variable. Soviet interlocutors argue that the level of trade with individual LDCs is scarcely affected by the payments mechanism. The SOFT coefficient could simply be picking up the fact that some of the Soviet Union's major LDC trade partners just happen to have soft currency clearing agreements.

It is interesting to note, however, that, when the SOFT dummy and GNP are entered into the equation (A[2] and B[2]), "socialist orientation" becomes decidedly less important, as does economic distance. In both of these equations, the level of Soviet exports are found to have a statistically significant negative relationship to per capita GNP. More than anything else, this relationship probably reflects the historic importance of Soviet aid-related exports, particularly machinery and equipment, in determining the pattern of Soviet exports of "civilian" goods to the developing world.

The only unexpected results in table D-1 involve the coefficient on the complementarity index. Negative but statistically insignificant for the larger sample, this coefficient becomes more negative and statistically significant when only Soviet-reported trade partners are considered. The reasons for this result are complex because they involve different aggregate Soviet shares (the $\alpha_i$) for the different product groups, variations in LDC import structure (the $\lambda_i$), and the geographical distribution of total Soviet exports to the developing world. In some cases Soviet exports to individual LDCs are negligible, even though the structure of their overall imports and the Soviet export weight would suggest large exports (for example, petroleum exports to Southeast Asian countries). In other cases Soviet exports of manufactures would seem to be greater than predicted on the basis of a relatively low Soviet share in total LDC imports and average or below-average LDC import weights (for example, machinery and equipment exports to Iraq, Iran, and Syria). In still other cases Soviet petroleum exports are greater than the individual LDC fuel import weights would suggest (for example, to Afghanistan and Bangladesh).

**Table D-2**
**Cross-Section Regressions Explaining Soviet Imports From the Developing Countries, 1975**

| | | | | | | |
|---|---|---|---|---|---|---|
| **A. Trading Partners According to DOT (n = 46)** | | | | | | |
| (1) $\ln V^x_{js}$ = | 0.69 ln COMPL (1.21) | −0.40 ln DIST (2.21)** | + 0.61 SOC ln e (0.68) | + 1.13 ln $V^x_j$ (4.79)*** | | $\bar{R}^2 = 0.63$ |
| (2) $\ln V^x_{js}$ = | 0.77 ln COMPL (1.41) | −0.24 ln DIST (1.28) | + 0.20 SOC ln e (0.25) | + 1.15 ln $V^x_j$ (4.96)*** | + 1.94 SOFT ln e (3.20)*** | −0.28 ln GNP (0.85) $\bar{R}^2 = 0.71$ |
| **B. Trading Partners According to VTSS (n = 41)** | | | | | | |
| (1) $\ln V^x_{js}$ = | 0.27 ln COMP (0.52) | −0.48 ln DIST (2.85)*** | + 0.07 SOC ln e (0.09) | + 1.11 ln $V^x_j$ (5.06)*** | | $\bar{R}^2 = 0.75$ |
| (2) $\ln V^x_{js}$ = | 0.69 ln COMPL (1.40) | −0.55 ln DIST (2.84)** | + 0.14 SOC ln e (0.20) | + 0.95 ln $V^x_j$ (4.26)*** | + 1.67 SOFT ln e (3.15)*** | −0.40 ln GNP (1.22) $\bar{R}^2 = 0.80$ |

[a] Statistics in parentheses under estimated coefficients. A***, **, or* denotes coefficient is statistically significantly different from zero at the 1-percent, 5-percent, or 10-percent levels, respectively.

25X1

The explanatory power of the individual estimating equations for Soviet imports in table D-2 is similar to that for exports, with $\bar{R}^2$ ranging from 0.63 to 0.80, and with the degree of explanatory power increasing for the smaller sample. Distance again appears with the expected negative sign, but with smaller elasticities (−0.24 to −0.55) than for exports and with a lower degree of statistical significance (compare the t statistics in the two tables). This is not surprising because we know that many Soviet imports from LDCs consist of primary products simply not available at home (for example, tropical foodstuffs, tropical hardwoods, and rubber) or may be bought to fill temporary priority needs (for example, grain) somewhat independently of transaction costs or geopolitical strategy. This same consideration is borne out by the positive signs in each case for the complementarity coefficient, which is also at least weakly statistically significant in three of the four equations. This is a striking difference from the export regressions.

Another difference is that "socialist orientation" plays no evident role in determining Soviet import levels across countries. Furthermore, per capita GNP has no systematic effect on Soviet imports, unlike on the export side. Both of these results are consistent with the findings for complementarity and economic distance, and together they suggest that the geographical pattern of Soviet imports has been determined to a much greater extent than for exports by purely economic factors. Interestingly, the positive impact on trade levels of soft currency clearing agreements is very similar in the two cases.

On the whole, and with the exception of the negative impact of complementarity on Soviet exports, these regression results are quite satisfactory. In each case between 60 and 80 percent of the variation in Soviet trade across LDC partners is explained, and, taken together, the import and export equations indicate that the pattern of Soviet "civilian" exports to LDCs is more heavily influenced by political factors than is the pattern of Soviet imports.

## Appendix E

## Methodology for Calculating Price Discrimination

This study does not compare a given LDC's prices in Soviet trade with a set of documented or hypothetical world market prices. Rather, the focus here is on the relationship between the developing country's actual prices in Soviet trade and the *average* prices in trade between all LDCs and the USSR. Therefore, no measurement of the countries' *absolute* implicit trade subsidy is sought here. Instead, alternative measures of the country's implicit trade subsidy *relative* to other LDCs are developed and calculated. Only if average prices in Soviet trade with the LDCs were in each case equal to world market prices would these calculations also reflect the absolute size of such subsidies. In general, these average prices will not be identical to world market prices, although one might expect them to be positively correlated. The relative subsidy can therefore best be thought of as measuring the net benefit (loss) to a developing country by not trading at average prices prevailing in Soviet-LDC trade.

In this study, the price differential for the $i^{th}$ commodity is defined as $(\bar{P}_i - P_{ij})$, where $\bar{P}_i$ is the average Soviet price for the $i^{th}$ commodity in trade with all LDCs, and $P_{ij}$ is the price of the $i^{th}$ commodity when traded with the $j^{th}$ developing country. The "prices" here are really unit values calculated from Soviet statistics on values and quantities. (U)

The average price, $\bar{P}_i$, may be either a weighted or unweighted average. The weighted average price of the $i^{th}$ commodity is defined as:

$$\bar{P}_i = \frac{\sum_{j=1}^{n} V_{ij}}{\sum_{j=1}^{n} Q_{ij}} \qquad (1)$$

where V and Q refer to values and quantities, respectively. The weighted average price will be affected more by the price for the larger Soviet trade partners. The unweighted average price is defined as:

$$\bar{P}_i' = \frac{\sum_{j=1}^{n} \frac{V_{ij}}{Q_{ij}}}{n} \qquad (2)$$

In this case each trading partner's price would receive an equal weight in the calculation of the overall average price, irrespective of its relative importance in Soviet trade of that commodity. 25X1

Clearly, expressions (1) and (2) will not in general be identical, and any overall index of relative price discrimination will yield a different measure depending on which concept of average price is used. In general, the effect of shifting from an unweighted to a weighted average price basis will be to move the calculated average price closer to the price(s) of the largest trading partner(s) in each commodity. This will reduce (increase) the size of the calculated price differentials for the larger (smaller) trading partners. This will also reduce (increase) the absolute size of the calculated relative subsidies and taxes, respectively, on individual products for the larger (smaller) countries. The net effect is indeterminant, however, because the extent to which calculated overall net subsidies on individual products will be reduced (increased) will depend on the different quantity weights as well as the changes in calculated price differentials. 25X1

25X1

The *relative* implicit trade subsidy is defined as the net ruble benefit to the $j^{th}$ developing country from trading with the USSR at prices which in general will be higher or lower than the average price prevailing in Soviet-LDC trade. As noted earlier, if these average prices were equivalent to "world market prices" (which may be thought of as an opportunity cost basis for the USSR and its trading partners), then the *relative* subsidy would be equal to the absolute subsidy in an opportunity cost sense. For the $i^{th}$ commodity traded with the $j^{th}$ country, the relative implicit trade subsidy is:

$$RS_{ij} = (\overline{P}_i - P_{ij})\, Q_{ij} \qquad (3)$$

where the relative subsidy on the $i^{th}$ product is positive if the $i^{th}$ product is a Soviet exportable and $RS_{ij} > 0$, and where it is positive if the product is a Soviet importable and $RS_{ij} < 0$. In other words, the USSR is deemed to be price discriminating in favor of the $j^{th}$ country if the latter is able to purchase the $i^{th}$ Soviet exportable at a below-average price or to sell the $i^{th}$ Soviet importable to the USSR at an above-average price.

The overall net relative subsidy to the $j^{th}$ country is:

$$RS_j = \sum_i (\overline{P}_i^x - P_{ij}^x)\, Q_{ij}^x - \sum_i (\overline{P}_i^m - P_{ij}^m)\, Q_{ij}^m \qquad (4)$$

where the superscripts x and m refer to exportables and importables, respectively. Expression (4) may be rearranged and rewritten as:

$$RS_j = \overline{B}_j - B_j \qquad (5)$$

where $\bar{B}_j$ and $B_j$ refer to the Soviet trade balance with the $j^{th}$ country in *average* and *actual* trading prices, respectively.

The concern here is not with whether the Soviet Union has a trade imbalance with individual developing countries. A Soviet trade surplus, for example, with a country with which it trades in hard currency on a more or less cash basis does not constitute a subsidy. Even a surplus with an LDC trading partner under a bilateral clearing agreement is not per se a subsidy, although there may be a subsidy element if the Soviets extend this credit at rates that are less than world market. Rather, the concern is solely with the question of whether trade with a given LDC was conducted at prices that differed from the average prices in Soviet trade with the developing world. Had Soviet prices for each commodity been identical across countries, the geographical pattern of Soviet trade volumes would have undoubtedly been different from what was actually observed. Thus, the individual trade balance evaluated in average prices ($\bar{B}_j$) is not meant to suggest what the trade balance actually would have been had all trade been conducted at average prices (that is, at identical prices across countries within a given product group). 25X1

If the relative subsidy is defined using *weighted* average prices (see expression [1]), the sum of the net relative subsidies across all countries is zero:

$$\sum_j RS_j = 0 \qquad (6)$$

Because of this theoretical property and the tendency of the unweighted average price calculation to give what would seem an unreasonably large weight to relatively small or even negligible trade partners, the weighted average price was selected for all measures of relative subsidy reported in this paper. Therefore, all such measures shall be referred to as *weighted* relative subsidy indexes. 25X1 25X1

It should be pointed out that if one country has a greater net relative subsidy than another in trade with the USSR, this need not imply that it has a greater absolute subsidy, designated AS where the latter is defined in relation to world market prices. The net absolute subsidy in trade with the $j^{th}$ country may be defined as:

$$AS_j = \sum_i (W_i^x - P_{ij}^x)\, Q_{ij}^x - \sum_i (W_i^m - P_{ij}^m)\, Q_{ij}^m \qquad (7)$$ 25X1

where $W_i$ refers to the world market price for the $i^{th}$ product. Defining $RS_{ij+1}$ (per expression (4)) and $AS_{j+1}$ analogously for the $j+1^{th}$ country and solving for $(AS_j - AS_{j+1})$ in terms of $(RS_j - RS_{j+1})$ gives:

$$\begin{aligned}(AS_j - AS_{j+1}) = {} & (RS_j - RS_{j+1}) \\ & - \sum_i [(\overline{P}_i^x - W_i^x)\,(Q_{ij}^x - Q_{ij+1}^x)] \\ & + \sum_i [(\overline{P}_i^m - W_i^m)\,(Q_{ij}^m - Q_{ij+1}^m)] \end{aligned} \qquad (8)$$

Clearly $RS_j > RS_{j+1}$ is not enough to guarantee $AS_j > AS_{j+1}$. Whether the ranking of the two countries will be the same in terms of the two subsidy measures depends on the size of innumerable $(\bar{P}_i - W_i)$ differentials and the pattern of $j^{th}$ and $j+1^{th}$ quantity weights. In general, however, if the calculated average prices are positively correlated with world market prices, the absolute subsidy rankings should roughly correspond to those by the relative subsidy measure.

Political factors and questions of product heterogeneity aside, the pattern of observed trade volumes and prices will clearly be related to the specific market structures involving individual products. Because some trading partners may be "large" countries with respect to some products and "small" countries in relation to others, it would be difficult to unambiguously generalize about the relationship between net relative subsidy ($RS_j$) and Soviet turnover ($V_j^x + V_j^m$) with the $j^{th}$ country. It might be reasonable to assume that the larger the turnover, the larger the absolute value of the relative subsidy. In any event, several alternative ways of normalizing $RS_j$ were experimented with in this study.

The first measure, $S_1$, is defined as the ratio of $RS_j$ to the total value of the unit value sample (from which unit values could be calculated), the latter evaluated in average prices:

$$(S_1)_j = \frac{RS_j}{(\bar{V}^x_{uv})_j + (\bar{V}^m_{uv})_j} \tag{9}$$

where $(\bar{V}^x_{uv})_j$ and $(\bar{V}^m_{uv})_j$ are the sum of the trade volumes making up the unit value sample, evaluated in average prices, for $j^{th}$ exports to and imports from the Soviet Union, respectively.

The second measure, $S_2$, is similar except that the denominator is the total value of the *deviation sample* (from which nonzero price differentials could be calculated), the latter evaluated in *average* prices:

$$(S_2)_j = \frac{RS_j}{(\bar{V}^x_d)_j + (\bar{V}^m_d)_j} \tag{10}$$

where $(\bar{V}^x_d)_j$ and $(\bar{V}^m_d)_j$ are the sum of the trade volumes making up the deviation sample, evaluated in average prices, for $j^{th}$ exports to and imports from the Soviet Union, respectively. The difference between the unit value and deviation samples arises from the fact that there exist some products for which unit values are available for only one country and which are therefore not included in the deviation sample. 25X1

A third measure is defined as the ratio of $RS_j$ to the *actual* value of the $j^{th}$ country's deviation sample: 25X1

$$(S_3)_j = \frac{RS_j}{(V^x_d)_j + (V^m_d)_j} \tag{11}$$

where $(V^x_d)_j$ and $(V^m_d)_j$ are the sum of the trade volumes making up the deviation sample, evaluated in actual $j^{th}$ trade prices. 25X1

The final two measures relate a country's implicit relative trade subsidy with the USSR to domestic variables of the country in question. The fourth index, $S_4$, is the ratio of $RS_j$ to $j^{th}$ population. 25X1

$$(S_4)_j = \frac{RS_j}{N_j} \tag{12}$$

where $N_j$ is population in the $j^{th}$ country. This gives a measure of the significance of the relative subsidy on a per capita basis.

The fifth measure relates the relative subsidy to $j^{th}$ GNP:

$$(S_5)_j = \frac{RS_j}{GNP_j} \tag{13}$$ 25X1

This measure suggests how important the relative subsidy is in relation to the existing level of income in the $j^{th}$ country. 25X1

Given the amount of work involved, calculations were made for just three years: 1970, 1975, and 1980. These particular years were picked to cover the entire past decade and also to represent a similar time in the Soviet five-year plan cycle—namely, the last year. 25X1

The calculations first involved identifying for each year the entire unit value sample for each of more than 70 LDC trade partners. Then all commodities had to be identified for which a unit value could be calculated for two or more countries (that is, for which price differentials could be calculated). In many instances, judgments had to be made as to the appropriate level of aggregation at which to conduct the analysis. Next, value and quantity data for each commodity-country combination were transcribed and later entered on the computer. Altogether, unit values were calculated for 183 different export and 90 import commodities, although the number varied from year to year. 25X1