Some Empirical Dimensions of Countertrade

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SOME EMPIRICAL DIMENSIONS OF COUNTERTRADE

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Abstract. This paper discusses some of the recent theories of why countries impose countertrade obligations and compares some of the implications of these theories with data obtained from a comprehensive database of countertrade transactions.

One of the major developments in international trade in the last decade has been the spread of a range of unconventional trade practices which have come to be defined by the generic term of countertrade. This development has attracted the attention of academics and practitioners, and there are now a number of excellent books and articles that analyze this phenomenon (for example, Alexandrides and Bower [1987]; Elderkin and Norquist [1987]; Fisher and Harte [1985]; Huszagh and Huszagh [1986]; Khoury [1984]; Korth [1987]; Verzariu [1980, 1985]; Yoffie [1984]. This literature has raised some very interesting questions. One of these is why countries impose countertrade obligations.

This article constitutes one of the first attempts at presenting data on countertrade so as to permit a preliminary assessment of the relevance of the major explanations given for countertrade. The data dispel some widely held views about countertrade; the oft-noted relationship between a country's credit rating and its propensity to countertrade is not as strong as commonly held; on the other hand, the data support the rival hypothesis that some forms of countertrade, buy-back and counterpurchase, are substitutes to foreign direct investment (FDI). The tables also show a surprisingly large volume of countertrade between developing countries themselves. But perhaps the most important finding is that each countertrade type seems to have its own separate motivations. The next section presents a typology of counter-trade transactions. This is followed by a brief section summarizing the competing explanations given for countertrade. The relevance of these

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explanations is then examined in light of the data. The conclusion summarizes the main findings and suggests avenues for further research.
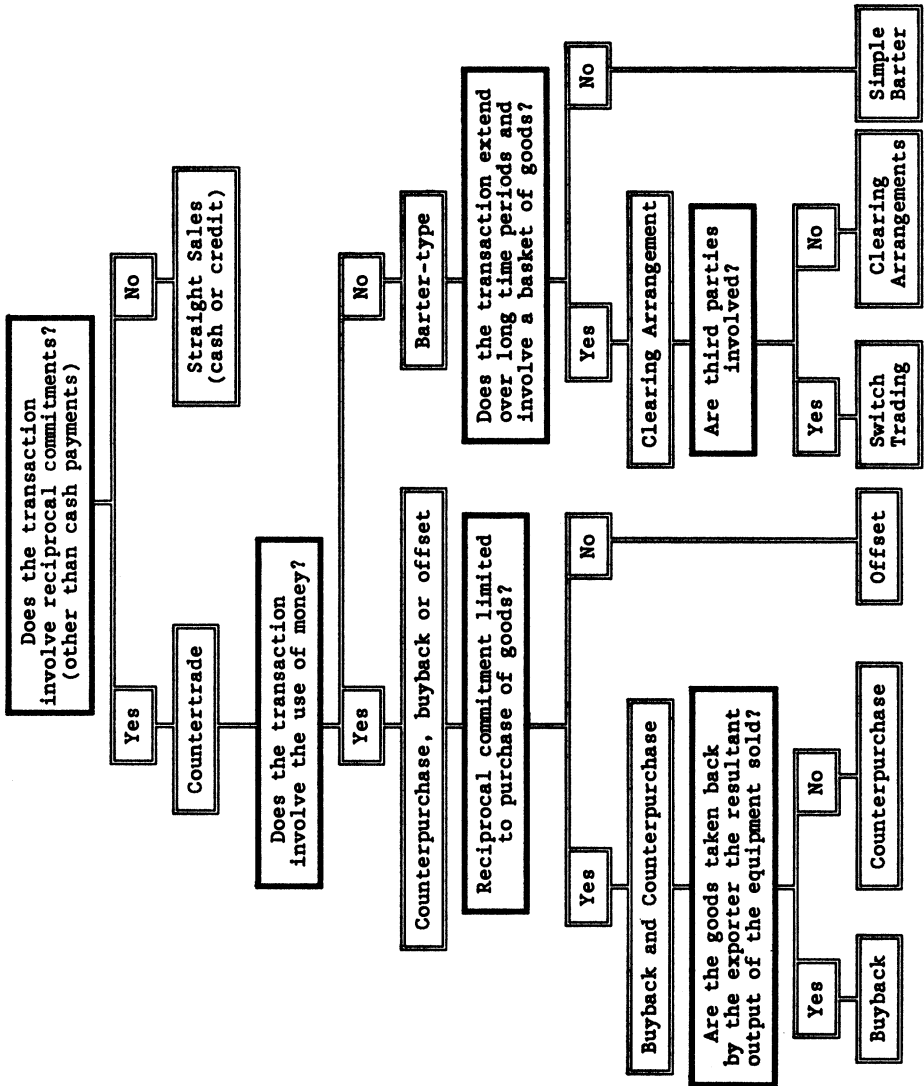
TYPES OF COUNTERTRADE

The term "countertrade" is used to describe six types of transactions: barter, clearing arrangements, switch trading, buy-back, counterpurchase, and offset. All these transactions have one characteristic in common: in each, a seller provides a buyer with goods or services and promises in return to purchase goods or services from the buyer [Banks 1983, p. 160]. Because countertrade usually results in a two-way flow of commodities, it is often considered to be only barter. In fact, there are important differences between barter, clearing arrangements, and switch trading, on the one hand, and the three other types of countertrade, buy-back, offset, and counterpurchase on the other. The first group of transactions is undertaken to avoid using money, while the main feature of the second group is the imposition of reciprocal commitments. Figure 1 provides a schematic classification of these six types of countertrade.

Barter (abbreviated as BT) is the direct exchange of goods and services between two parties without the use of money. Barter usually involves the swap of one product for another, but a large number of barter exchanges can be consolidated into a *clearing arrangement* (CA). In this form of barter, each party agrees, in a single contract, to purchase a specified (usually equal) value of goods and services. Each country sets up an account that is debited whenever one country imports from another. At the end of the period, imbalances are cleared through hard currency payments or transfer of goods. A clearing arrangement merely introduces the concept of credit to a barter arrangement, thereby allowing a barter transaction to be settled in a non-instantaneous fashion. The inflexibility inherent in a clearing arrangement can be alleviated by *switch trading*, which consists in buying a country's position in exchange for hard currency and selling it to another customer.

In contrast to barter, the other forms of countertrade, offset, buy-back, and counterpurchase involve the use of money or credit.[1] They consist of two parallel money-for-goods contracts. The crucial feature of these contracts is the imposition of reciprocal commitments. The commitment requested from the exporter may consist in reciprocal purchases, as in the case of buy-backs and counterpurchase, or in a complex menu of reciprocating concessions, as in the case of offsets.

In a typical *buy-back* (BB) transaction, the exporter transfers technology (embodied in plant and equipment, or disembodied), and agrees to purchase in return a certain percentage of the plant's output over a given number of years. Note that, contrary to popular impressions, buy-back agreements do not usually involve the barter of plant and equipment for resultant output. Instead, buyback contracts stipulate two parallel money transactions: when the project is completed, the plant seller is paid in full by the buyer from

FIGURE 1
Classification of Forms of Countertrade

Does the transaction involve reciprocal commitments? (other than cash payments)

- No → Straight Sales (cash or credit)
- Yes → Countertrade

Does the transaction involve the use of money?

- No → Barter-type

  Does the transaction extend over long time periods and involve a basket of goods?

  - No → Simple Barter
  - Yes → Clearing Arrangement

    Are third parties involved?

    - No → Clearing Arrangements
    - Yes → Switch Trading

- Yes → Counterpurchase, buyback or offset

  Reciprocal commitment limited to purchase of goods?

  - No → Offset
  - Yes → Buyback and Counterpurchase

    Are the goods taken back by the exporter the resultant output of the equipment sold?

    - Yes → Buyback
    - No → Counterpurchase

hard currency borrowed from eastern or western sources. The buyer then uses the proceeds of the sale of the output to the plant seller to repay the lender [Verzariu 1980, p. 93; 1985, p. 28; McVey 1980, p. 202; United Nations 1984, p. 10). For example, two British firms, ICI and Davy Powergas, sold in 1977 a methanol plant to the Soviets for 250 million dollars and agreed to take back 20% of the production of the plant over the 1981-1990 period for an estimated 350 million dollars.

Counterpurchase (CP) involves, like buy-back, two parallel hard currency contracts, but differs from buy-back insofar as the goods that are taken back by the western seller of goods or equipment are not produced with the equipment sold. The western exporter agrees to buy unrelated goods from a shopping list set up by the importer. The list may change from time to time, but the commitment is to buy from the list as it stands at a later date, at prices posted at a later date. The list often contains light manufactures and consumer items which do not have a ready market. For example, in 1977 Volkswagen sold 10,000 cars to East Germany, and agreed to purchase goods from a list set up by the East Germans over the next two years, up to the value of the cars sold to East Germany [Shuster 1980].[2]

The term *"offset"* (OF) is used to describe the imposition on exporters of a more complex basket of reciprocal concessions. When governments make large purchases from foreign companies, they increasingly insist that the purchase price be offset in some way by the seller. The latter has to agree to source some of the production locally, to increase its imports from the country, or to transfer technology. Offsets are particularly common in the purchase of weapons, but they are also imposed by government agencies on imports of non-military equipment.

The term countertrade thus covers contracts with two main purposes. The first type are barter contracts, and they are undertaken to avoid using money or to avoid having to set a money-price. The second type (offset, buy-backs, and counterpurchase) makes use of hard currency. The main feature of these contracts is the presence of reciprocal commitments.

MOTIVATIONS FOR COUNTERTRADE: EXISTING HYPOTHESES

The traditional reason given for the emergence of countertrade is that it is a response to a decline in the borrowing ability of a number of centrally planned and developing countries. This reduced access to foreign exchange, joined to exchange control policies which systematically overvalue domestic currencies, and thus tend to discourage exports and encourage imports, is seen as the main reason why those countries impose countertrade. Many observers [Elderkin and Norquist 1987; McVey 1980] consider countertrade as analogous to barter: its use is supposed to allow countries to trade without the need for foreign exchange. Consequently, the dominant viewpoint in official circles has been that the development of countertrade is essentially a return to barter, and that it represents as such a retrogression from the present system of multilateral trade and payments [de Miramont 1985].

This viewpoint is increasingly being challenged. In 1983, Banks showed that this argument is logically flawed, and arises from the erroneous view that all countertrade transactions involve barter. In fact, as we have seen, two common forms of countertrade, buy-back and counterpurchase, are not barter transactions, but consist of linked money-for-goods transactions. Mirus and Yeung [1987] looked at the impact of countertrade on the determinants of the main components of the balance of payments, and concluded that barter and counterpurchase have at least a neutral, and possibly a negative impact on foreign exchange shortages, while the impact of buy-back would seem to be negative in the short run. More generally, the fact that barter is used in a domestic context, where trades can be transacted in local currency, shows that there are other important motives for barter.[3]

Recently, a number of authors [Murrell 1982; Kogut 1983, 1986; Parsons 1985; Mirus and Yeung 1984 1986; Hennart 1986, 1989; Lecraw 1987] have identified alternative reasons why countries may find it in their interest to impose countertrade obligations. Focusing on the reciprocal aspects of buy-backs and counterpurchase, these authors argue that these forms of countertrade serve to solve some of the problems faced by developing or centrally planned economies (CPEs).

The direction of recent research has therefore been to turn away from motives, such as the desire to save on foreign exchange, that would apply to all forms of countertrade. Here I will distinguish between barter-type transactions, on the one hand, and those forms of countertrade that make use of money, i.e., buy-backs, counterpurchase, and offset, on the other. There are some common motives within each group, but few across all groups. Hence I will first analyze motives that are common to both barter and countertrade, and then separately those that apply to each main group of countertrade transactions. Table 1 summarizes the various motives for the five main types of countertrade.

Motives Common to All Countertrade Transactions

One motivation that is common to both barter and countertrade is that of shifting risks. Through counterpurchase, buy-back, and barter, an importing country can obtain a promise from a seller to purchase a quantity of agreed-upon products and services at some future date. These commitments insure that today's outlays of foreign exchange will be balanced by future inflows. Countertrade and barter can therefore substitute for missing forward markets, and this form of trade will be imposed by countries that want to shift the risk of uncertain export receipts to their western partners. These risk-averse countries are likely to be centrally planned economies (CPEs) [Parsons 1985; Kogut 1986]. CPEs are notoriously poor at marketing their products abroad, since they never have to market them in their own countries. In a planned system, the consequences of unstable export receipts are

TABLE 1
Potential Motives for Countertrade

	Types of Countertrade				
	BT	CA/ST	CP	BB	OF
Avoids using foreign exchange	Yes	Yes	No	Rarely	No
Avoids repayment of external debt	Yes	Yes	No	No	No
Hides price discounts	Yes	Yes	No	No	No
Shifts risk	Yes	Yes	Yes	Yes	Sometimes
Substitute for FDI	No	No	Yes	Yes	Yes
Political factors dominant	No	Yes	No	No	Yes

See text for details.

also particularly traumatic [Holzman 1976]. Hence the desire of these countries to balance trade on a country-by-country level whenever possible, and on a firm-by-firm basis (i.e., through counterpurchase, buy-back, and offset) when dealing with countries where trade is not a state monopoly [Hennart 1986].[4] Hence our first hypothesis.

> H1: Countertrade, in all of its forms, is undertaken to shift the risk of fluctuations in export receipts, and will be disproportionately undertaken by centrally planned economies.

Motives for Barter

The distinguishing characteristic of barter is that it allows exchange without the use of money, and thus without explicit prices. Barter is therefore useful to (1) bypass price controls, whether public or private; (2) bypass exchange controls, and (3) bypass creditor's monitoring of imports. Additionally, barter can be a useful way to obtain marketing services. As will be clear from the analysis, the ability of barter to save on foreign exchange is much more limited than generally thought.

Bypass Price Controls

Because one barters without money, and hence without money prices, using barter makes it possible for sellers to covertly reduce prices, a property useful in the disposition of goods that benefit from domestic price supports or international price controls, and of those produced at low marginal cost. Buyers are willing to go along insofar as the barter terms of trade are more advantageous than those that would be charged if payment were in hard currency.

In many countries, government bodies purchase several agricultural products (for example dairy products and grains in the United States) at above-market prices. Bartering can be a desirable way to liquidate the ensuing surpluses, because it disguises the fact that the price to foreign buyers is usually a fraction of that charged domestic customers [Banks 1985, p. 250-54]. One recent example of such barter is the exchange of U.S. dried milk

for Jamaican bauxite. Barter is also useful in selling commodities, the price of which is kept above equilibrium by cartels and international commodity agreements. Barter deals make it possible to lower the effective price of such commodities without attracting attention from the other cartel members, or from the other parties to the commodity agreement. Nigeria, Iran, Libya, Indonesia, Iraq, Qatar, and Abu Dhabi have used such barter deals to sell oil below the OPEC price to both developed and less-developed countries, and some experts have estimated that between 10% and 20% of OPEC's oil exports were thus bartered in 1984 [Banks 1985, p. 257, quoting *Petroleum Economist*, May 1984].

Barter can also be useful in the case of goods for which fixed costs make up a large proportion of total cost. Such goods are produced in capital-intensive plants, or in countries where legal prohibitions to fire employees make labor a fixed factor. In that case, the firm experiencing a temporary downturn in its sales will have a strong incentive to sell as much as possible above variable costs, as long as these sales do not jeopardize their other full-price markets. By disguising the price paid, barter allows such discounting without antagonizing traditional customers who continue to buy at normal prices [Cooper 1984, p. 39].

One would therefore expect the share of barter in international trade to be particularly high for commodities, the price of which is artificially kept above equilibrium through domestic price supports, cartels, or commodity agreements, and for products for which fixed cost is an important component of total cost. Hence the following hypotheses:

> H2: Barter will be mostly used for goods, the price of which is fixed above market-clearing levels by domestic price supports, cartels, or commodity agreements.

Since most goods covered by these schemes are commodities,

> H2a: The proportion of exports subject to barter should be greater for foods, raw materials, and fuels, than for manufactures.

Note that this motive for countertrade only applies to barter because, in contrast to barter, counterpurchase and buy-back cannot be used to disguise prices since they consist of two separate contracts, each for cash or credit.

Bypass Exchange Controls

Of all countertrade types, only barter can be said to save on foreign exchange, and then only in a limited sense. It can alleviate foreign exchange shortages for a firm, but not for a country. By entering into a barter transaction, a firm denied foreign exchange by the exchange control authorities can keep importing if it can procure domestic goods for sale abroad. Barter is thus a government-sanctioned way for importers to evade foreign exchange controls. The advantage of barter for exporters located in countries with free access to foreign exchange is that accepting payment in a marketable commodity reduces the risk of the contract not going through due to the vagaries and the delays inherent in the foreign-exchange allocation

processes of most countries which impose exchange control [Mirus and Yeung 1986]. Barter does not save on foreign exchange at the country level, however, because the exportable goods that are offered in barter could be sold for hard currency.

Bypass Creditor Monitoring

Barter can also be useful when foreign lenders stipulate that foreign exchange receipts must be earmarked for the service of the debt. Since barter allows a country to import without using foreign exchange, it makes it possible for a country to keep its traditional level of imports by shielding some of its hard currency export receipts from its creditors [Graubart and Sachs 1984, p. 22; Mirus and Yeung 1987, p. 542].[5] Admittedly the country that pays for its imports by bartering export products will have to pay more for its imports, or to accept lower prices for its exports, unless there is double coincidence of wants. One special case is the trade between two heavily indebted countries, where both parties have interest in shielding export receipts from creditors. This would suggest that there might be a relationship between a country's indebtedness and its propensity to barter, but that this relationship should not exist for other types of countertrade, i.e., buy-back, counterpurchase, and offset [Mirus and Yeung 1987; Hennart 1986; 1989]. Consequently,

> H3: The relationship between debt (as proxied by creditworthiness) and countertrade should be greater for barter than for counterpurchase and buy-back.
>
> H3a: Barter will be disproportionately used in commerce between heavily indebted countries.

Access Marketing Services

Barter can also be used to shift the responsibility for marketing goods to the other party. This is likely to be advantageous for countries having a temporary excess supply of goods with a low probability of being exported ever again. The western exporter is willing to enter such trades to gain market access if it has a comparative advantage in marketing [Mirus and Yeung 1986, p. 36].

Motives for Countertrade Forms that Impose Reciprocity

As we have seen, buy-back, counterpurchase, and offset consist of two separate but linked contracts. A counterpurchasing country must pay (or borrow) hard currency for its imports, and gets hard currency back when the return transaction is completed. Because imports from the West are usually delivered first, and because counterpurchase obligations often cover only a part of import value, exports from the counterpurchasing country cannot be used to completely finance the import [Jones 1984, p. 15; Welt 1984, p. 59]. Buy-back also involves two separate contracts, each paid in hard currency.[6] Credit is needed since the exporter of plant and equipment must wait a number of years before he can be repaid in resultant product.

The lending bank does not take the buy-back contract as security. In fact, banks insist that no mention of the western firm's commitment to purchase the plant's output appear in the export contract, and consider the borrower solely liable for repayment of the loan [Verzariu 1980, p. 27].

One could argue that the assurance of a ready market for the goods produced with the project would improve its credit rating in the eyes of a western bank. But this would be true only in the cases of a private borrower. In a planned economy, like the USSR, there is no guarantee that the cash flow generated by the project will be used to repay the debt. Therefore the lending bank will consider the country's overall credit-worthiness. Buy-back will not allow such countries to exceed their credit limits [Banks 1983, p. 166].

While the characteristic of barter is the fact that it effects trade without the use of currency, the distinguishing mark of buy-back, counterpurchase and offset is the presence of reciprocal commitments. Of the three, offset is the most complex, arising from the interaction of political and economic factors. Buy-back and counterpurchase, on the other hand, can be explained as attempts to reduce transaction costs [Murrell 1982; Kogut 1983, 1986; Parsons 1985; Mirus and Yeung 1986; Hennart 1986, 1989; Lecraw 1988].

Three types of transaction costs are relevant in this context: (1) those that characterize the international sale of technology because of information asymmetry between the parties [Akerlof 1970]; (2) those present in the market for distribution services when distributors need to make transaction-specific investments; (3) those that are due to small-number conditions in the market for intermediate inputs. The most efficient way to reduce these transaction costs is to replace markets by hierarchy (i.e., FDI) [Casson 1982; Hennart 1982]. Host countries that prohibit incoming FDI may find the transaction costs of using simple contracts prohibitive and may attempt to reduce them by relying on the reciprocal commitments featured in buy-back and counterpurchase contracts [Kogut 1986; Mirus and Yeung 1986; Hennart 1986, 1989].

Murrell [1982], for example, has argued that buy-backs are used to signal in the West the product quality of goods produced in centrally planned economies (CPEs). Products from Eastern European CPEs have a reputation for poor quality. A western firm that would agree to distribute to the West products produced by an eastern enterprise would suffer if the eastern party failed to provide after-sales service or a reliable supply of spare parts. To signal its intention to reliably provide such service, the eastern firm will have its western equipment seller handle the export of the resultant product. This will signal to western consumers that the goods are of above-average quality. This arrangement increases the price at which the eastern output can be sold in the West, and hence the price that the western seller receives for its capital. Hence both CPEs and western equipment sellers stand to benefit from buy-backs. Note that counterpurchases cannot provide this

signal, since, under counterpurchase, the goods distributed by the western party have not been produced with its equipment.

One of the implications of the model is that buy-back will be particularly useful the more important product quality is to successful sales, and the higher the cost of testing for quality. Murrell argues that the two conditions are met in the case of industrial equipment (products that are classified in Standard Industrial Trade Classification category no. 7). Hence, according to Murrell [1982, p. 598],

> H4: The proportion of buy-back contracts that involve a product from SITC 7 will be greater than the proportion of counter-purchase contracts which involve a product from SITC 7.

More generally, food, raw materials and fuels tend to be more standardized than manufactures, and the usefulness of buy-backs should be greater for the latter than for the former. Hence,

> H4a: Buy-back will be used more often for manufactures than for food, raw materials and fuels.

Following the path first blazed by Kogut [1983, 1986], Mirus and Yeung [1984, 1986], Parsons [1985], and Hennart [1986, 1989] consider buy-back contracts (which force the seller of licenses or equipment to take back some of the output produced with the equipment) as a way to incite the technology seller to provide state-of-the art equipment and to supply after-sales service. Parsons and Hennart argue that sellers who provide outdated technology will have to take back inferior outputs. Those that fail to provide after-sales service may receive no output all all. To the extent that the equipment seller has made investments for the disposal of the goods taken back, or to the extent that his reputation would suffer from contract repudiation, failure to effectively transfer technology will result in substantial cost to the seller itself. Since the quality of goods also depends on the performance of the technology buyer, having the technology seller take back a share of the output guarantees that he will not use inferior inputs or slack in his effort [Kortian 1988]. Mirus and Yeung [1984, 1986] present a slightly different argument which applies to the relatively less common cases when payment for the technology is in resultant products (i.e., buy-backs are akin to intertemporal barters). In that case, and if there is a monotonic relation between the quality of output and the quality of the technology, the technology buyer can influence the level of quality of the technology received by varying the quantity of resultant output taken back by the technology seller [Mirus and Yeung 1986, p. 32].

Similarly, some authors [Mirus and Yeung 1986; Hennart 1986, 1989] have argued that counterpurchase can be seen as a device to reduce the costs of arranging the international marketing of products. Hennart [1986, 1989] argues that it is difficult to persuade independent distributors to make the transaction-specific investments necessary for the successful distribution of products in foreign countries, because distributors fear being "held up" by manufacturers once the investments are made. The solution to this problem

is vertical integration between manufacturing and trading [Chandler 1977; Hennart 1982]. This solution is not available to countries that ban or limit incoming FDI. Counterpurchase may, however, be used as a partial substitute. By telling their suppliers that they will import only if the supplier takes back and markets their products, countertrading countries can force suppliers to make these manufacturer-specific marketing investments that they would not undertake otherwise. Coca-Cola has, for example, made substantial investments to market in the West the wine produced by its Yugoslav bottler because the hard currency earned from such sales is used by the bottler to pay for syrup purchases [Hennart 1989].[7]

Lastly, buy-back (or variants thereof, such as loan-and-import) can substitute for vertical integration in the procurement of intermediate inputs when the market for such inputs is narrow. In that case, a potential supplier would have to make investments geared to a single customer. Simple long-term contracts are unlikely to persuade a potential supplier to make such investments, because the supplier will fear that the buyer will opportunistically renegotiate the contract after the investment is made. If the market is narrow, the buyer will be able to "hold up" the supplier, because the latter will have few or no alternative customers. The best solution to this problem is vertical integration between the buyer and the resource owner [Mirus and Yeung 1986]. Buy-back offers an alternative when FDI is impossible or deemed prohibitively risky. Under buy-back, a potential buyer provides up-front equipment or financing to a foreign supplier in exchange for a promise that a specified volume of the products thus generated will be shipped to the buyer. This protects the supplier against ex-post renegotiation by the buyer, since the supplier can threaten in that case not to pay for the equipment already received or not to repay the loan. A buy-back contract is therefore analogous to a bond posted by the buyer as a guarantee to the potential seller that he will not be held up after the investment is made. Posting such a bond may persuade a local firm to undertake production, giving the buyer a reliable, long-term source of supply [Hennart 1989].

The principal implication of the approach taken by Kogut, Mirus and Yeung, Parsons, and Hennart is that buy-back and counterpurchase are contractual substitutes to FDI [Mirus and Yeung 1986; Hennart 1986, 1989]. Countries that ban incoming FDI should therefore be the principal users of these two forms of countertrade. Hence the following hypotheses:

> H5: Buy-back will be disproportionately imposed by countries that ban incoming FDI.

Since barriers to incoming FDI are particularly high in the extraction of natural resources,

> H5a: Buy-backs will be more commonly used for the extraction of natural resources than for manufacturing.

> H6: Counterpurchase will be disproportionately used by countries that ban incoming FDI.

Since the export of manufactures tends to require greater manufacturer-specific investments than that of commodities, we would also expect that

> H6a: Counterpurchase will be more extensively used for the
> export of manufacturers than for that of fuels, raw materials
> and food.

Offset, which is limited to large public purchases, especially those of military equipment, seems motivated by complex political factors. There are at least two possible reasons for this practice. First, politicians seek to increase domestic employment since high rates of unemployment would reduce their chances of reelection. Buying domestic goods has a faster, more direct impact on employment than importing. If no domestic suppliers are available, a second best policy is to constrain the foreign seller to increase domestic employment by subcontracting part of the work with local firms and by purchasing other domestically produced goods and services. Second, offset may be a way to covertly subsidize a domestic industry seen as strategic by the government, whenever a direct subsidy would be politically unacceptable [Waller 1986]. In both cases, this suggests that countries that impose offset obligations are likely to be countries that are not large enough to support a domestic weapons industry, but rich enough to purchase advanced weapon systems. Consequently,

> H7: Countries that impose offsets are likely to be small developed
> countries.

METHODOLOGY

The only empirical evidence concerning countertrade comes from surveys of exporters, such as those directed by Bussard [1983, 1986]. Although extremely informative, these surveys only cover U.S. exporters. They tend also to lump together all types of countertrade. Yet we have seen that each type of countertrade has a somewhat different rationale (hence the present study that reports on countertrade transactions worldwide and that separates them by type).

The approach used was to rely on published sources. An informal telephone survey of countertrade observers and practitioners was made to identify possible sources. *Countertrade Outlook*, a weekly newsletter that reports on "countertrade and non-traditional trade" developments throughout the world, was consistently ranked as the most comprehensive and reliable of all publications dealing with countertrade. All issues of *Countertrade Outlook* between the first issue (June 1983) and the last issue of 1986 were surveyed. For each reported countertrade deal, we recorded the type of countertrade, the name and country of the seller, the goods sold, the name and country of the buyer, and the goods offered by the buyer as take-backs. The database includes all countertrade contracts that were mentioned as having been signed between June 1983 and December 31, 1986. The compilation yielded 1,277 transactions, of which 694 were classified as clearing arrangements, 171 as barters, 298 as counterpurchase, 71 as buy-backs, and

43 as offset.[8] The coding was done by an assistant, who was given a list of coding rules. Exchanging of goods for goods, without the use of money, was classified as barter if the exchange was not undertaken within existing clearing arrangements. Offsets are sometimes distinguished from counter-purchases by the fact that they involve military purchases; here transactions were classified as offsets if they involved more than a simple reciprocal sale, i.e., if the agreement obligated the seller to transfer technology, to subcontract to local firms, or to make direct investments in the buying country. All entries were reviewed by the author for correct classification.

The data source contains some biases. According to the editor of *Counter-trade Outlook*, countertrade done by small countries tends to be under-reported, while other countries where the magazine has correspondents tends to be over-represented in relation to their importance in global countertrade.[9] To minimize the impact of these potential biases, the analysis is conducted in terms of groups of relatively homogeneous countries.

In each trade, there is one or more buyer(s) and seller(s). Buyer, in this context, refers to the party that imposes a countertrade obligation, usually (but not always) a LDC or an Eastern European country. The seller, on the other hand, is the party that accedes to countertrade demands. It is usually a firm based in a developed country. The distinction between buyer and seller applies to buy-backs, counterpurchase, and offset, but is difficult to make for barters and clearing arrangements, since in this case it is impos-sible to determine in practice the trading partner that imposed a reciprocal obligation.

ANALYSIS OF THE DATA

Table 2 shows the total number (frequency) of deals that were coded. Clearing arrangements account for nearly half of the reported instances of countertrade, in part because they tend to be reported officially. The second most common form of countertrade in the database is counterpurchases. Offsets are the least common variety. These results are generally consistent with those found from surveys (for example, Bussard [1983]), except that barters seem here to be relatively more numerous.

Tables 3 and 4 tabulate the number of countertrade deals of each type with the countries that imposed them (the buyers) or responded to them (the sellers).[10] Countries were aggregated into five groups: the Developed Coun-tries (Group 1), OPEC members (Group 2), Centrally Planned Economies (Group 3), Middle-Income Countries (Group 4), and Low-Income Countries (Group 5). The classification is that used by the World Bank (the distinction between low-income developing, middle-income developing, and developed country is based on per capita income). The composition of each group is given in the Appendix.

The main impression given by Table 3 is that each group of countries has a propensity to undertake a particular type of transaction. A chi-square test

TABLE 2
Total Number of Countertrade Deals, 1983-86

Type of Deals	Number of Deals	% of total
Involving no Currency		
Clearing Arrangements	694	54.3
Barters	171	13.4
Involving Currency and Reciprocity		
Buy-backs	71	5.5
Counterpurchases	298	23.2
Offsets	43	3.3
Total	1,277	100.0

TABLE 3
Number of Countertrade Deals by Type
and Country Group of Buyers

	Country Group					
Countertrade Type	Developed Countries	Centrally Planned Economies	OPEC Members	Middle-Income Developing	Low-Income Developing	Total
Counterpurchase	12	72	104	88	20	296
Buy-back	1	55	6	11	0	73
Offset	15	1	7	15	1	39
Total	28	128	117	114	21	408

shows that the null hypothesis that all observations come from the same population is rejected at the 99% confidence level (chi-square=151.69). OPEC, middle-income developing, and low-income developing countries impose more counterpurchases, CPEs more buy-backs, and developed and middle-income developing countries more offsets than would be expected if there were no relationship between country group and countertrade type. CPEs had a particularly high frequency of buy-backs, accounting for fifty-five deals out of seventy-three, or three-fourths of the total. Note that there is only one instance of a buy-back imposed by a developed country in our sample. As we will see, this finding is consistent with the view that buy-backs are a second-best substitute to foreign direct investment. CPEs and low-income developing countries are not active in offsets for two separate reasons: CPEs are prohibited from purchasing weapons in the West, while low-income developing countries cannot afford the type of sophisticated weapons sold under offset. This differential frequency of types of counter-trade across groups of countries suggests that it is unlikely that a single factor (such as lack of foreign exchange) could account for this complex phenomenon.

Table 4 is a tabulation by seller country. The table shows a definite pattern in the extent to which specific countries are subject to countertrade obligations

TABLE 4
Number of Countertrade Deals by Type
and Country Group of Sellers

Countertrade Type	Country Group					
	Developed Countries	Centrally Planned Economies	OPEC Members	Middle-Income Developing	Low-Income Developing	Total
Counterpurchase	194	29	5	67	13	308
Buy-back	63	11	0	3	0	77
Offset	56	2	0	1	0	59
Total	313	42	5	71	13	444

(the chi-square value of 41.97 is significant at the 99% confidence level). OPEC and developing countries have higher observed than expected counterpurchase frequencies. This is also the case for developed countries and CPEs with buy-backs, and for developed countries with offsets. Thus although the bulk of counterpurchase requirements has been imposed on exporters from the developed countries, they have been relatively less subject to these obligations than OPEC and developing countries. Note also the significant number of cases involving middle-income developing countries and CPEs selling technology and equipment under buy-back.

Tables 5 through 8 show the structure of countertrade by type and country group. Table 5 provides this information for barter deals. No attempt is made in this case to differentiate between buyer and seller, so the table is symmetrical along the diagonal. As the table shows, the most common form of barter involves two middle-income developing countries; this is consistent with the view that barter is used to avoid repayment of external debt. There is here a coincidence of wants, as both countries are eager to shelter their export earnings from creditors. Barter is also common between developed countries and middle-income developing countries, and between middle-income developing countries and CPEs. The total absence of barter deals between OPEC members and between developed countries supports the view that barter is used to bypass cartels and commodity agreements: OPEC members do not sell oil to each other, so there are no opportunities to use barters in such trades. Also, most developed countries have similar types of price support programs, so agricultural surpluses cannot usually be bartered with other developed countries.

Table 6 presents the matrix of counterpurchase transactions. The columns represent sellers, and the rows buyers. Counterpurchase appears as imposed principally by OPEC, middle-income developing countries, and CPEs, on developed countries mostly, but also on middle-income developing countries. Note the relatively low incidence of counterpurchase imposed by developed and low-income developing countries.

The idiosyncratic characteristics of buy-backs appear clearly in Table 7. Buy-backs are clearly an East-West phenomenon, with more than two-thirds

TABLE 5
Matrix of Countertrade, Barter Only

Country Group	Country Group					
	Developed Countries	Centrally Planned Economies	OPEC Members	Middle-Income Developing	Low-Income Developing	Total
Developed countries	0					0
Centrally planned economies	15	3				18
OPEC members	16	3	0			19
Middle-income developing	30	26	18	31		105
Low-income developing	7	10	1	8	2	28
Total	68	42	19	39	2	170

TABLE 6
Matrix of Countertrade, Counterpurchase Only

Country Group of Buyers	Country Group of Sellers					
	Developed Countries	Centrally Planned Economies	OPEC Members	Middle-Income Developing	Low-Income Developing	Total
Developed countries	7	2	2	1	0	12
Centrally planned economies	47	2	1	22	3	75
OPEC members	75	4	1	21	3	104
Middle-income developing	55	19	1	15	4	94
Low-income developing	9	1	0	7	3	20
Total	193	28	5	66	13	305

TABLE 7
Matrix of Countertrade, Buy-backs Only

Country Group of Buyers	Country Group of Sellers					
	Developed Countries	Centrally Planned Economies	OPEC Members	Middle-Income Developing	Low-Income Developing	Total
Developed countries	0	1	0	0	0	1
Centrally planned economies	50	3	0	2	0	55
OPEC members	11	0	0	0	0	11
Middle-income developing	4	8	0	0	0	12
Low-income developing	0	0	0	0	0	0
Total	65	12	0	2	0	79

TABLE 8
Matrix of Countertrade, Offsets Only

Country Group of Buyers	Country Group of Sellers					
	Developed Countries	Centrally Planned Economies	OPEC Members	Middle-Income Developing	Low-Income Developing	Total
Developed countries	18	0	0	0	0	18
Centrally planned economies	1	0	0	0	0	1
OPEC members	16	0	0	0	0	16
Middle-income developing	14	2	0	1	0	17
Low-income developing	1	0	0	0	0	1
Total	50	2	0	1	0	53

of all buy-backs imposed by CPEs, almost all of them on developed countries. Note however that OPEC countries and middle-income developing countries have also imposed buy-backs on both developed countries and CPEs. The table shows only one case of buy-back involving developing countries as buyers: if buy-backs are a "second best" substitute to FDI and are imposed to reduce opportunism in the purchase of technology, then countries that put few limits on incoming investment (by and large the developed countries) will choose this institutional form in preference to buy-backs. The only case of buy-back imposed by a developed country is a 1985 agreement between Australia and Romania, in which Romania agreed to supply mining and handling equipment for an iron ore mine, and take payment in iron ore. Since Eastern European countries have generally been reluctant to make equity investments abroad, and since Australia had then stringent limits of foreign ownership of natural resources, this apparent exception is in fact consistent with the view that buy-backs are second-best substitutes to FDI.

The table also shows eight other cases where a CPE sold technology and equipment under buy-back to a non-CPE buyer, and was asked to take back the output. One of these cases is that of Greece, which has recently bought an alumina plant from the USSR under buy-back.[11] These eight observations, and the two cases where a middle-income developing country sold technology under buy-back to a socialist country, suggest that the use of buy-back to signal product quality is not limited to East-West trade, and/or that buy-back is a mechanism to reduce transaction costs in the sale of technology. Developing countries and CPEs do not generally have an established reputation as reliable sellers of plant and equipment. We would expect, therefore, that countries that buy technology from these vendors would require the latter to take back the resultant product so as to minimize the risk that they will be sold inferior or obsolete technology. Similarly, one interpretation of the data is that CPEs enter into buy-backs with developing

countries to stimulate the development of resources for which they are the main buyer. This is clearly the case of Greece's alumina plant, for which the USSR and Romania will be the sole customers.

Offsets, on the other hand, are shown in Table 8 to involve almost exclusively developed countries selling to a variety of buyers. Of interest is the negligible role played by CPEs. This is explained by the fact that offsets usually involve weapons, and that trade in these products between East and West is severely constrained by considerations of national security.

Looking at Tables 3 to 8, one is struck by the large share of countertrade that is carried out among middle-income developing countries. Most theories of countertrade have focused on East-West and on North-South trade. This suggests that more attention needs to be paid to the motivations for South-South countertrade. Note that barter accounts for most of the transactions between middle-income developing countries (compare Table 5 with Tables 6, 7 and 8). As was argued above, this is consistent with the view that barter can be used by heavily indebted countries to avoid repayment of debt.

The database also provides information on the products that are traded through countertrade. Tables 9, 10, and 11 tabulate the goods sold by each group of countries under countertrade. In the case of barter, the product count reflects products sold by each group of countries. The product count for counterpurchase and buy-back is that of goods taken back by the technology seller or the initial exporter. The last column shows the product composition (in value) of exports of the relevant country group in 1985, as published in the *Handbook of International Trade and Development Statistics*. This column reflects the prior distribution of all feasible deals.

Table 9 shows that the proportion of CPE barter, counterpurchase, and buy-back sales that were manufactures (70%, 59.3% and 56.8%), was higher than the proportion of manufactures in their overall trade (47.7%). The difference was statistically significant at the 95% confidence level in the case of counterpurchase and barter, and at the 90% level in the case of buy-backs. This means that manufactures were more likely to be exported under countertrade than were other CPE exports. Note that we are comparing product count with value data, due to the lack of data on the value of countertrade transactions. A chi-square test shows that the hypothesis that the rows and columns are independent cannot be rejected: there seems to be no relationship between product category and countertrade type in the case of CPEs.[12] In other words, buy-back deals are no more likely to involve manufactures than barter and counterpurchase transactions. This seems to be at variance with Murrell's hypothesis that buy-backs are used to signal product quality in the West. Recall that because product quality is more variable in manufactures (and especially in industrial equipment-SITC 7) than in food, raw materials and fuels, Murrell had hypothesized that the proportion of goods from SITC 7 taken back under buy-back should be greater than that taken back under counterpurchase (H4). On the

TABLE 9
Distribution of Products Taken Back under Countertrade from Centrally Planned Economies

Product Categories	SITC Group	Countertrade Type						% of all Trade
		Barter		CP		BB		
		Number	%	Number	%	Number	%	
Food and raw materials	0,1,2,4	8	16	12	20.3	15	29.4	18.9
Fuels	3	7	14	12	20.3	7	13.7	33.4
Manufactures	5-9	35	70	35	59.3	29	56.8	47.7
Of which	7	(15)	(30)	(10)	(16.9)	(15)	(29.4)	
Total		50	100	59	100.0	51	100.0	100.0

Source: Trade by Commodity: UNCTAD, *Yearbook of International Trade and Development Statistics, 1987 Supplement.*

TABLE 10
Distribution of Products Taken Back under Countertrade from OPEC Member Countries

Product Categories	SITC Group	Countertrade Type				% of all Trade
		Barter		CP		
		Number	%	Number	%	
Food and raw materials	0,1,2,4	5	13.1	40	39.0	4.1
Fuels	3	29	76.3	10	10.0	91.8
Manufactures	5-9	4	10.6	52	51.0	4.1
Of which	7	(0)	(0.0)	(3)	(3.0)	
Total		38	100.0	102	100.0	100.0

Source: Trade by Commodity: UNCTAD, *Yearbook of International Trade and Development Statistics, 1987 Supplement.*

other hand, the fact that the industrial distribution of buy-backs is no different than that of barters and counterpurchases is not inconsistent with the view that buy-backs and counterpurchases are second-best substitutes for FDI.

Table 10 provides the same data for OPEC countries. What is striking are the differences between the type of products sold under barter and those sold under counterpurchase.[13] Crude oil makes up the bulk (76%) of the products sold under barter, but only 10% of those sold under counter-purchase. Conversely, only 10% of the barters involve manufactures vs. 51% of the counterpurchases. This reinforces the point made earlier that barter and counterpurchase have very different motivations: barter is useful to shave on cartel prices, while counterpurchase is imposed to help penetrate foreign markets. Since successful distribution of manufactures generally requires the distributor to make greater transaction-specific investments than in the case of food, raw materials, or fuels, we would expect counterpurchase

TABLE 11
Distribution of Products Taken Back under Countertrade from High and Low-Income Developing Countries

Product Categories	SITC Group	Countertrade Type						% of all Trade
		Barter		CP		BB		
		Number	%	Number	%	Number	%	
Food and raw materials	0,1,2,4	49	69.0	29	35.8	6	54.5	32.9
Fuels	3	6	8.4	3	3.7	1	9.0	18.4
Manufactures	5-9	16	22.5	49	60.4	4	36.3	48.7
Of which	7	(3)	(4.2)	(12)	(14.8)	(1)	(9.0)	
Total		71	100.0	81	100.0	11	100.0	100.0

Source: Trade by Commodity: UNCTAD, *Yearbook of International Trade and Development Statistics, 1987 Supplement.*

to be more useful for the export of manufactures than for that of food and raw materials.

Tables 9, 10 and 11 also show that the proportions of counterpurchase sales by CPEs, OPEC and developing countries that are manufactures are greater than that of manufactures in their overall exports. The difference is statistically significant at the 95% confidence level (at the 99% level for less-developed countries). This provides some support for arguments (such as those made by Mirus and Yeung [1986] and Hennart [1989]) that counterpurchase is used as a second-best method to secure marketing assistance from the West.

Product data for all developing countries is presented in Table 11. Note again the differences between the product composition of barter and counterpurchase transactions: barters are heavily concentrated in raw materials (69% of all bartered products), while products sold under counterpurchase are mostly manufactures (60.4% of all counterpurchase take-backs). A chi-square test shows that there is a relationship between product category and countertrade type (chi square=22.54, $p<.001$), with barters used for raw materials and counterpurchases used for manufactures more frequently than if the probability distributions in both columns were the same. Since most products supported by cartels are agricultural and mineral commodities, this is consistent with the view that barters, because they disguise prices, are useful to shave prices on cartelized commodities. This goal cannot be attained through counterpurchase. As noted above, the high proportion of manufactures among counterpurchased products is also consistent with the hypothesis that counterpurchase is a marketing tool for differentiated products. Note also the high proportion of food and raw materials among the goods taken back under buy-back, a finding consistent with the hypothesis that buy-back is a substitute for FDI.

Tables 12, 13 and 14 relate a country's propensity to impose countertrade to their credit rating. If these forms of countertrade are undertaken in

response to difficulties in obtaining hard currency credits, then the bulk of countertrade transactions ought to be imposed by countries with a low credit rating. Countries are classified in three groups: the first group contains countries that had a rating equal or below the median, the second group, countries with a rating above the median, and the third group, countries for which a credit rating was not available. Countries with the lowest credit rating accounted for 16% of all reported buy-back deals, 25% of all counterpurchase deals, and 38% of all barter deals (the total is the number of deals in countries for which credit rating was known).[14] Since countries with a low credit rating account for 9% of world trade, this suggests the existence of a strong relationship between a country's low creditworthiness and its propensity to barter, and a weaker one with its propensity to counterpurchase and buy-back. The fact that the relationship is stronger with barter than with buy-back or counterpurchase is consistent with H3.

Tables 15 and 16 compare a country's propensity to impose buy-backs and counterpurchase with the restrictions it puts on incoming foreign direct investment.[15] If buy-backs are a second-best solution to the problem of acquiring technology, the first-best being foreign direct investment, then countries that restrict incoming foreign direct investment should be the ones requesting buy-back commitments from the firms that sell them technology. Table 15 provides strong support for this hypothesis: 80% of all buy-backs were imposed by twenty-eight countries with very high or high barriers on incoming investment. This percentage is higher than the share of world trade by countries of these two groups (15%), and the difference is highly significant ($z=14.0$).

Table 16 also supports the view that counterpurchases are substitutes for vertical integration between manufacturing and distribution. Effective distribution of differentiated goods often requires a hierarchical link between production and distribution, i.e., vertically-integrated channels [Hennart 1989]. Producers in countries that ban or severely restrict incoming FDI cannot use vertically integrated marketing channels, and must instead rely on contracts. Counterpurchases are sophisticated export-marketing contracts with an enforceability that is greater than simple distribution contracts, but lower than FDI. They should therefore be used mostly by countries that have imposed severe restrictions on incoming FDI. Table 16 provides support for this hypothesis. Sixty-five percent of all counterpurchase contracts were imposed by countries with very high or high barriers to incoming FDI, a proportion significantly higher than their share of world trade (14%).

Table 17 enumerates the main hypotheses and indicates the degree of support from the data. The evidence is only suggestive since we are only looking at partial relationships. More definite conclusions should await the results of multivariate analyses.

TABLE 12
Credit Rating and Buy-back Frequency

	1985 Credit Rating			
	Below and Equal to Median	Above Median	Unknown	Total
Number of Countries in Group	54	53	61	168
Number of BB deals	11	55	4	70
Percent of all deals	15.7	78.6	5.7	100
Share of World Trade of Countries in Group	9.0	89.5	1.5	100

Sources: Credit Rating: *Institutional Investor.*
          Trade: International Monetary Fund, *Directions of Trade.*

TABLE 13
Credit Rating and Counterpurchase Frequency

	1985 Credit Rating			
	Below and Equal to Median	Above Median	Unknown	Total
Number of Countries in Group	54	53	61	168
Number of CP deals	61	170	14	245
Percent of all deals	24.9	69.4	5.7	100
Share of World Trade of Countries in Group	9.0	89.5	1.5	100

Sources: Credit Rating: *Institutional Investor.*
          Trade: International Monetary Fund, *Directions of Trade.*

TABLE 14
Credit Rating and Barter Frequency

	1985 Credit Rating			
	Below and Equal to Median	Above Median	Unknown	Total
Number of Countries in Group	54	53	61	168
Number of BT deals	122	197	19	338
Percent of all deals	36.1	58.3	5.6	100
Share of World Trade of Countries in Group	9.0	89.5	1.5	100

Sources: Credit Rating: *Institutional Investor.*
          Trade: International Monetary Fund, *Directions of Trade.*

TABLE 15

Barriers to Investment and Buy-back Frequency

| | Host Country Barriers to New Investment | | | | | |
	Very High	High	Medium	Low	No Data	Total
Number of Countries in Group	14	14	31	21	88	168
Number of BB deals	17	39	11	1	2	70
Percent of all deals	24.3	55.7	15.7	1.4	2.8	100
Share of World Trade of Countries in Group	4.5	9.9	28.4	52.9	4.2	100

Sources: Barriers to New Investment: Business International, Country Assessment
Service.
Trade: International Monetary Fund, *Directions of Trade*.

TABLE 16

Barriers to Investment and Counterpurchase Frequency

| | Host Country Barriers to New Investment | | | | | |
	Very High	High	Medium	Low	No Data	Total
Number of Countries in Group	14	14	31	21	88	168
Number of CP deals	36	123	64	9	13	245
Percent of all deals	14.7	50.2	26.1	3.7	5.3	100
Share of World Trade of Countries in Group	4.5	9.9	28.4	52.9	4.2	100

Sources: Barriers to New Investment: Business International, Country Assessment
Service.
Trade: International Monetary Fund, *Directions of Trade*.

CONCLUSION

This paper has presented some evidence on the patterns taken by counter-
trade. Although the information presented in this paper is derived from
what is believed to be the largest database of countertrade transactions avail-
able, caution must be exercised in interpreting the tables, as the database
undoubtedly only includes a fraction of all countertrade deals that were
initiated over the period. As mentioned earlier, the proportion of counter-
trade deals reported depends also on whether *Countertrade Outlook* had
correspondents in that particular country. Because of the lack of reliable
data on value, the analysis has been conducted in terms of the number of
countertrade agreements. This make it difficult to evaluate the relative
importance of countertrade in the total trade of countries and of products.

In spite of the limitations of the data, the tables provide some interesting
insights into the countertrade phenomenon. The most important finding is
that each type of countertrade has its own patterns and is motivated by

TABLE 17
Main Findings

H1:   Countertrade, in all of its forms, is undertaken to shift the risk of fluctuations in export receipts, and will be disproportionately undertaken by centrally planned economies.

Partial support; Table 3: Important, but not dominant, role played by CPEs.

H2:   Barter will be mostly used for goods, the price of which is fixed above market-clearing levels by domestic price supports, cartels, or commodity agreements.

Support; Table 5: Low number of barters between OPEC members, and between developed countries.

H2a: The proportion of exports subject to barter should be greater for foods, raw materials, and fuels, than for manufactures.

Mixed; Tables 9, 10, 11: Food, raw materials and fuels make up a larger percentage of all bartered products than manufactures for OPEC and developing countries, but not for CPEs.

H3:   The relationship between debt (as proxied by creditworthiness) and countertrade should be greater for barter than for counterpurchase and buy-back.

Support; Tables 12, 13, 14: The percentage of BTs undertaken by countries with a low credit rating is greater than that of CPs and BBs.

H3a: Barter will be disproportionately used in commerce betwen heavily indebted countries.

Support; Table 5: The most common form of barter is that between two middle-income developing countries.

H4:   The proportion of buy-back contracts that involve a product from SITC 7 will be greater than the proportion of counterpurchase contracts that involve a product from SITC 7.

No support; Table 9: No statistically significant relationship between countertrade type and product group in the case of CPEs.

H4a: Buy-back will be used more often for manufactures than for food, raw materials, and fuels.

Mixed: Table 9. Relatively high proportion of commodities sold by CPEs under BB.

H5:   Buy-back will be disproportionately imposed by countries that ban incoming FDI.

Support; Table 3: Overwhelming proportion of BBs are imposed by CPEs. Table 15: The proportion of BBs imposed by countries with high barriers to incoming FDI is significantly greater than their share of world trade.

H5a: Buy-backs will be more commonly used for the extraction of natural resources than for manufacturing.

Mixed; Tables 9 and 11: The proportion of BB involving food, raw materials, and fuels is greater than that involving manufactures in the case of developing countries, but not in that of CPEs.

H6:   Counterpurchase will be disproportionately used by countries that ban incoming FDI.

Support; The proportion of CPs imposed by countries with high barriers on incoming FDI is significantly greater than their share of world trade.

H6a: Counterpurchase will be more extensively used for the export of manufactures than for that of fuels, raw materials, and food.

Support; Tables 10 and 11: CP disproportionately used to export manufactures.

H7:   Countries that impose offsets are likely to be small developed countries.

Partial Support; Table 2 and 4: OFs are overwhelmingly imposed by developed countries on other developed countries.

different factors. Even at the fairly broad level of aggregation used here, there are major differences among country groups in their use of countertrade. This suggests that future empirical research should be conducted at a disaggregated level and should focus on the differential use of particular types of countertrade by particular groups of countries.

NOTES

1. Although imbalances in clearing arrangements are sometimes settled through hard currency payments, the intended function of clearing arrangements is to swap goods for other goods, and thus to avoid the use of hard currency.

2. Counterpurchase differs from clearing arrangements insofar as it involves payment in foreign currency. In a clearing arrangement, importers pay and exporters get paid in local currency.

3. For a discussion of domestic barter, see for example Kaikati [1976] and Ross [1982].

4. Western firms are willing to absorb the risk (for a fee) for reasons outlined in Kogut [1986, pp. 53-54]. They are also much more competent in marketing than their Eastern European counterparts.

5. As Mirus and Yeung [1987, p. 542] states, this strategy will be pursued the larger the fraction of export receipts impounded to repay the debt, the smaller the additional transaction costs of countertrade over straight trade, and the easier it is to escape detection by creditors.

6. In some rare cases, the buyer of technology pays the technology seller by delivering a share of the output. Buy-back is then analogous to intertemporal barter.

7. Weigand [1980] gives some other interesting examples on how counterpurchase has been used to that end.

8. Switch trading was coded as clearing arrangement.

9. These countries are Columbia, the Dominican Republic, Guatemala, Thailand, and Zimbabwe.

10. The number of deals in these tables may vary from the totals of Table 2 for two reasons: (1) data may be missing for some observations and (2) some agreements may involve more than one seller or more than one buyer. In that case, the agreement is counted once for each buyer or seller country.

11. Greece is classified as a middle-income developing country.

12. The chi-square was 7.41, which is not significant at the 90% confidence level.

13. A chi-square of 64 allows us to reject the hypothesis that there is no relationship between countertrade type and product class at the 99% confidence level.

14. For barters, the number of transactions is the sum of those undertaken by both buyers and sellers. For example, in the case of a barter undertaken between Algeria and Canada, the table would contain one entry for Canada and one entry for Algeria.

15. The data for barriers to investment was obtained from the original worksheets for Business International's *Country Assessment Service* for January 1985. The data describes the level of limits on new investment, with a score of 0 meaning no foreign equity allowed, and 10 no limits on foreign investment. I formed the following categories: Very high limits = score of 0 to 2 (basically no foreign equity allowed); high limits = score of 3 to 5 (only minority foreign investment allowed); medium limits = score of 6 to 8 (local equity required or strongly recommended); low limits = 9-10 (no limits on FDI).

APPENDIX

Countries were aggregated into five groupings: the developed countries [Group 1], OPEC members [Group 2], centrally planned economies [group 3], Middle-income developing countries [Group 4], and Low-income developing countries [group 5]. The assignment of countries to each group (with the exception of groups 2 and 3) follows that used by the World Bank (1979). Low-income developing countries are countries with 1977 per capita income less or equal to US$300. Middle-income developing countries had a 1977 per capita income above US$300.

Developed Countries

W. Germany	Australia	U.S.	Italy
Finland	Austria	Ireland	Sweden
New Zealand	Belgium	Canada	France
Switzerland	U.K.	Norway	Japan
Netherlands	Denmark		

Centrally Planned Economies (CPEs)

USSR	Yugoslavia	Romania	Poland
Hungary	E. Germany	Czechoslovakia	Bulgaria
Cuba	Mongolia	Albania	N. Korea
Vietnam	China		

OPEC Countries

Nigeria	Algeria	Saudi Arabia	Libya
Iraq	Iran	Kuwait	Qatar
Venezuela	Ecuador	Gabon	Indonesia
U.A.E.			

Middle-Income Developing Countries

Egypt	Cameroon	Ghana	Honduras
Thailand	Senegal	Philippines	Zambia
Congo	Zimbabwe	El Salvador	Morocco
Bolivia	Ivory Coast	Jordan	Colombia
Guatemala	Korea	Nicaragua	Dominican Rep.
Peru	Tunisia	Syria	Malaysia
Guyana	Turkey	Mexico	Jamaica
Lebanon	Chile	Taiwan	Panama
Costa Rica	S. Africa	Brazil	Uruguay
Argentina	Portugal	Hong Kong	Greece
Israel	Singapore	Spain	Barbados
Belize	Malta	Surinam	Trinidad

Low-Income Developing Countries

Afghanistan	Burma	Cambodia	Bangladesh
Laos	Ethiopia	Mali	Nepal
Somalia	Burundi	Chad	Rwanda
Upper Volta	Zaire	Malawi	India
Mozambique	Niger	Pakistan	S. Leone
Tanzania	Benin	Sri Lanka	Malagasy
Kenya	Uganda	Mauritania	Sudan
Angola	Togo	Botswana	Guinea
Eq. Guinea	Cape Verde		

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