COUNTERTRADE TRANSACTIONS:
RATIONALES, STRUCTURE, OUTCOMES

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ABSTRACT

Countertrade transactions may cover 20 percent of international trade yet are little researched. Testing several coherent models on 230 transactions (mainly East-West), we find: (1) strong evidence that they effect price discrimination for Western exporters; (2) no support for a model resting on sticky disequilibrium prices; (3) limited support for a model of efficient revelation of unestablished qualities of countertraded goods; (4) evidence of bargaining power's effect on outcomes in the bargaining range; and (5) evidence that participants engage in repeated countertrade transactions, which do not rest on transitory conditions.

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1.   INTRODUCTION

Countertrade consists of bilateral agreements (usually) between Western industrial enterprises and government agencies or state-owned enterprises in developing countries and centrally planned economies,[1] whereby sales of goods by the western exporter are linked contractually to the exporter's purchases of other goods or services from the countertrade partner.[2] A substantial and growing proportion of international trade is governed by this type of barter or reciprocity. Estimates vary wildly, but 15 to 20 percent of total world trade seems plausible.[3] However, countertrade has received very little

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1.   The analysis is confined to nonmilitary countertrade. Its military counterpart involves large offset transactions and co-production agreements frequently between western industrial countries (U.S. International Trade Commission, 1985; Group of Thirty, 1985; Golden, 1987).

2.   The terms exporter and partner will be used as shorthand in this paper. It is not fruitful to treat the parties to these barter transactions as if they were symmetrically positioned.

3.   See the review of recent semiofficial estimates by Hammond (1990, pp. 10-11). The proportion is much higher for East-West trade (Banks, 1983).

scholarly attention, despite its seeming defiance of the economic presumption that barter is less efficient than money-for-goods transactions.[4]

This paper reports findings from the intensive analysis of a sample of 230 countertrade agreements. We develop an analytical framework that both explains the mutual attraction of countertrade deals to the parties and predicts the terms of trade that will be reached in individual transactions. Various statistical tests serve to assess assumptions underlying the model, evaluate various predictions and corollaries, and distinguish between certain competing hypotheses about the motives or effects of countertrade transactions. In the first section, we briefly describe the types of countertrade transactions and review the explanations that have been offered for them. A framework is then advanced in the second section to develop the most promising aspects of existing models. The third section describes the sample and provides simple tests of selected assumptions and corollaries. The fourth tests the model's predictions about the terms of trade reached in these transactions.

Countertrade embraces three principal types of transactions:

1. <u>Barter</u>. Barter transactions are distinguished not by the absence of money payments but for constraining the monetary values of bilateral sales and purchases to equality. Their principal users have been developing countries (LDCs) that maintain extensive controls on international trade and payments and whose currencies are not convertible internationally. Barter transactions

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4.   Aside from a few studies of practices and consequences in developing countries (Banerji, 1977; Outters-Jaeger, 1979; Jones and Jagoe, 1988), most of the literature consists of similar practitioner books such as Elderkin and Norquist (1987) and Verzariu (1985). Some of these (such as Welt, 1984) contain worthwhile systematic, personal observations on countertrade patterns. Hammond's (1990) review of the journalistic literature is thorough.

tie the acquisition of imports to the sale of additional exports sufficient to pay for them. They are accordingly not used for imports assigned the highest priority in a disequilibrium situation. Microeconomic transactions of the barter type shade into macroeconomic bilateral clearing agreements.[5]

2. <u>Counterpurchase</u>. Counterpurchase agreements similarly are monetary but tied bilateral transactions, typically between a western industrial firm and a state enterprise or trading agency in a centrally planned economy (CPE) or LDC. In return for the countertrade partner's purchase of the western firm's export, the firm agrees to make a stream of purchases from the partner. The goods to be purchased may be stipulated in advance, or the western firm may be free to choose them within stated limits; the purchases are made within an agreed period of time, and a penalty is imposed for nonperformance. Goods eligible for counterpurchase typically exclude those which the partner country already exports regularly to industrial-country customers, and their attributes and quality levels may not match those that are standard in western commercial channels. A western firm acquiring goods under barter or counterpurchase agreements may utilize them itself but commonly resorts to the services of an intermediary specialized in marketing them.

3. <u>Buyback transactions</u>. Buyback transactions typically involve the exchange of western capital goods for outputs of those goods, and they involve credit extended to the capital-goods purchaser that is repaid in kind with the processed output. Buyback transactions are a purer form of barter than the preceding types, but also have evident, specific, and distinctive rationales. They provide an efficient way to finance investment when the capital-goods

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5. See OECD (1985) and Banerji's (1977) account of India's experience. European countries went through a similar phase of bilateralism after World War II (Diebold, 1952).

buyer operates in the domain of an inconvertible currency, and they may also solve agency and risk-sharing problems more efficiently than could conventional methods of financing investments.[6] Because of their distinctiveness, buyback transactions are largely put aside in the following analysis.

Apart from these explanations of buyback transactions, the theoretical bases of countertrade are obscure. Many suggestions appear in the descriptive literature, but most of these fall short of coherent models that explain why countertrade dominates more conventional transactions for both parties. We find three general explanations.

The first rests on price discrimination (Caves, 1974). A party possessing monopoly power can benefit from discriminating between customers with different levels of willingness to pay but is constrained by the possibility of resale. When the monopolist undertakes a barter deal with a customer whose reservation price is low, the deal obscures the effective transaction price from disfavored customers who otherwise might insist effectively on equally favorable treatment.

The second model also turns on prices not equal to marginal costs, in this case due not to monopoly but to regulation or market behavior that gives rise to inflexible (nonclearing) prices. Barter deals allow two parties to transact at a relative price not consistent with their stipulated money prices. These deals can prove Pareto-superior when disequilibrium prices prevail due to collusion or regulatory constraints (Fisher and Harte, 1985,

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6. Parsons (1985) argued that non-simultaneous barter arrangements generally can be regarded as forward sales in the absence of organized forward markets. Other papers that focus on buyback transactions are Kogut (1986), Mirius and Yeung (1984), and Hennart (1989).

pp. 156-67; Walters, 1985). They also can implement rent-seeking distortions that arise when seller A of an overpriced good shifts input purchases to a less efficient supplier B, who also is a customer for the overpriced good and can credibly threaten to withhold purchases that yield to A an excess of price over marginal cost.[7]

The third explanation focuses on the fact that the quality, attributes, or performance of some CPE and LDC goods may be unknown on the market and subject to a "lemons" problem. Murrell (1982) analyzed buybacks in terms of asymmetrical information, proposing that the capital-goods supplier not only receives a signal of quality (to the extent it depends on the capital good's qualities) but also wields the ability to punish the user for substandard quality (because the user remains dependent on the supplier for service, spare parts, and the like).[8] Amann and Marin (1989) showed the potential advantage of barter in a distorted situation where the counterpartner can use the gains from bargaining with an exporter to subsidize its own exports and disimpact their unestablished market values.

These explanations do not exhaust the literature, but the omitted items lack the property of attributing rational action to both parties. For example, countertrade is considered an artifact of inefficient centrally planned economies with inconvertible currencies, allowing CPE producers to carry out trade while avoiding the constraints of their distorted prices. We put such explanations aside in favor or more purposive hypotheses.

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7. A specific application is to partner countries maintaining overvalued exchange rates for which countertrade can serve as a selective devaluation (Banks, 1983). If the exporter marks up his price by x percent and then purchases goods of equal value salable at world price only at a discount of x percent, the effect is identical to a selective x percent devaluation.

8. Murrell confirmed some corollaries of the model statistically.

2. A FRAMEWORK FOR ANALYZING COUNTERTRADE TRANSACTIONS

In this section we set out a framework to analyze countertrade transactions. It draws upon and develops certain suggestions in the literature just summarized. It also assumes certain properties mentioned in the descriptive literature that can be tested with our data base. The approach is designed not for maximum abstraction but for conformance to the traits regularly ascribed to actual countertrade deals.

We make the following assumptions:

1. The profit-maximizing western exporter quotes a price p_x per unit of output x. p_x is common knowledge. The market for x is impurely competitive in that buyers do not regard other offers of x as perfect substitutes.

2. The countertrade partner is a state ministry or enterprise with the responsibility for acquiring importables including x and marketing some exportable output of its country. The partner seeks to maximize national benefits from the trade agreement. Its exportable c is not (normally) exported, and its quality is known only to the partner, although that quality can be contracted upon and verified at a cost. The exporter learns p_c, the price of c, in the course of negotiations.

3. Each party has a reservation price that is private information. For the western exporter the reservation value r_x might be its marginal cost or the marginal revenue from its next best sale opportunity. The trading partner's reservation values are v_x, the benefit it obtains from consuming the western export, and r_c, the opportunity cost of producing the countertrade good.

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4. Because the western exporter is assumed not to be a pure competitor, $p_x > r_x$. Also, $v_x > r_c$ and $v_x > r_x$, but $v_x \gtrless p_x$. A Pareto-improving exchange is therefore feasible.

5. There exists a competitive industry of trading firms that mobilize inputs need to assist the negotiation of countertrade deals, verify qualities of countertrade goods, and locate buyers for goods that do not conform to conventional standards of quality and other attributes.

6. The countertrade partner is unable to resell the exporter's good even if $v_x < p_x$. This bald assumption, makes price discrimination feasible, stands in for the subtle ways in which countertrade facilitates it. Countertrade transactions may assist price discrimination because (1) countertrade partners (CPEs and LDCs) are apt _a priori_ to have low reservation prices, (2) countertrade negotiations themselves can expose information on the partner's reservation price, and (3) the effective price paid for the export good in a countertrade transaction is obscure to third parties and thus does not foment demands for equally favored treatment among customers who normally pay p_x.

These assumptions suffice to establish the feasibility of counterpurchase and barter deals that share the main features of deals actually observed and would dominate any alternative transactions for the parties. The exporter quotes $p_x > r_x$, its reservation value (by Assumption 4). The quantity of x exchanged in a countertrade deal is normalized at one unit, sale of which obligates the exporter to buy q units of countertrade goods at the quoted price p_c. The market value of these goods (net of the trading firm's charge) is p_c^*. The exporter's net benefit is therefore $B_x = (p_x - r_x) - q(p_c - p_c^*)$. The first term is positive by Assumption 4 and the

second may be negative by Assumption 2. If $B_x > 0$ despite $p_c > p_c^*$, the exporter will seek to minimize q in negotiating the countertrade deal.[9]

The countertrade partner obtains gross benefit v_x and net benefit $(v_x - p_x)$ from consuming the exporter's good. The value of the deal to the countertrade partner therefore is $B_c = (v_x - p_x) + q(p_c - r_c)$. The second term is presumed positive by Assumption 2. If so $B_c > 0$ does not require $v_x > p_x$. If $p_c > r_c$, the partner seeks to maximize q in the countertrade negotiation.[10] With the parties negotiating on q given the other parameters, there exists a maximum q^x at which the exporter just breaks even and a minimum q^p at which the partner's benefits are nonnegative. If $q^x > q^p$ a viable deal exists, and the bargaining turns on division of the surplus associated with $q^x - q^p$.[11]

Common knowledge of p_x (Assumption 1) is important for this result. If the counterpartner stipulates q in advance and p_x is private information (or known only subject to uncertainty), the bargaining would focus on p_x rather than q, and a bargaining range can be defined on p_x. Alternatively, if the western exporter can hold p_x private while discovering v_x and r_c, p_x can be set to maximize B_x. For the exporter the optimal $p_x \geq v_x$, increasing with the partner's benefits from $q(p_c - r_c) > 0$.

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9. If $p_c < p_c^*$, the exporter has an interest in increasing q, as does the partner. We consider the implications of this case below. With $p_c > p_c^*$, a competitive exporter $(p_x = r_x)$ will not accept a countertrade deal.

10. If $p_c < r_c$ but $v_x > p_x$, the countertrade partner simply buys x for cash (that is, minimizes q).

11. The breakeven minimum q^p is 0 if $v_x > p_x$, $(p_x - v_x)/(p_c - r_c)$ if $v_x < p_x$ and $p_c > r_c$. The breakeven maximum q^x for the exporter is $(p_x - r_x)/(p_c - p_c^*)$.

Although a countertrade deal can yield net benefits to the participants, the conditions are stringent for it to be the best choice for both parties. Consider their total benefits, $B = B_x + B_c = (v_x - r_x) + q(p_c^* - r_c)$. Although it was shown natural for them to bargain over q given p_x and p_c, the expression for B demonstrates that a shared interest exists either in maximizing q if $p_c^* > r_c$ or setting $q = 0$ if $p_c^* < r_c$. That is, one party or the other has an incentive to renegotiate the deal. If the countertrade goods are unprofitable to sell $(p_c^* < r_c)$, both parties are better off if they simply negotiate a mutually agreeable p_x and scrap the sale of the countertrade goods.[12] If the countertrade goods are profitable to sell $(p_c^* > r_c)$, the partner prefers to untie the quantity sold of the countertrade goods from the purchase of the exporter's good; if locked into the exchange, the partner would be willing to pay a higher p_x in order to expand profitable sales of countertrade goods $(p_c > p_c^* > r_c)$. If the counterpartner can determine p_c^* by dealing directly with the trading house, countertrade can still be an advantageous shelter to allow the parties to share the benefits of price discrimination by the exporter.[13] Without that, however, the countertrade deal can survive renegotiation incentives only to the extent that a fixed cost must be paid to get access to sales at p_c^* in a different transaction.[14]

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12. That is, the western exporter can profit by offering a lower p_x in exchange for setting $q = 0$.

13. Those benefits can be positive if $(v_x - r_x) > 0 > q(p_c^* - r_c)$. Hennart (1989) emphasized the role of transaction costs of determining p_c^*.

14. This analysis omits the dependence of v_x on the number of units bought and of p_c^* and r_c on q, because the empirical investigation focuses on the occurrence and terms of countertrade deals, not their scales. The theory of reciprocal agreements recognizes their use to implement all-or-nothing offers that extract all surplus, but a review of casual evidence reveals no

This analysis yields a number of implications for the empirical
investigation of countertrade transactions:

1. The terms defined in the preceding analysis correspond directly to
the terms set in actual countertrade (barter and counterpurchase) agreements,
so that data we obtained can be used to estimate the distribution of benefits.
Consider the exporter's benefit function, $B_x = p_x - r_x - q(p_c - p_c^*)$. The
empirical counterpart to q is the <u>compensation ratio</u>, the total value (not
volume) of purchase obligations assumed by the exporter divided by the value
of the initiating export (qp_c/p_x). The term $(p_c - p_c^*)/p_c$ is referred to as
the <u>discount ratio</u>. The product of the compensation ratio and the discount
ratio is therefore equivalent to the model's $q(p_c - p_c^*)$ normalized by the
value of exports; it will be the dependent variable in the regression analysis
that follows.

2. The analysis shows that the terms of the countertrade deal (given
that a bargain is struck) are constrained by various reservation prices.
Although these are not observed directly, we can devise proxies for the
differences among agreements in v_x (relative to p_x), r_x (relative to
p_x), and the structural determinants of r_c or p_c relative to p_c^*. These
proxies will embrace forces affecting these reservation values both in long-
run equilibrium and subject to short-run distortions. For example, an
exporter in a leading position in its market should have a higher reservation
value than a fringe producer with a lesser goodwill asset. A producer with
excess capacity or in a market with softening prices should have a lower
reservation price.

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empirical counterparts (Caves, 1974).

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3. Although price discrimination is a sufficient explanation for countertrade, it is an excessively restrictive way to characterize the exporter's situation. The price p_x only needs to be common knowledge. It is not necessary that any other buyer actually be paying it.

4. Rich if diverse predictions bear on the competitive positions of the countertrade parties. Although the model rules out pure competition in the exporter's market, it admits differences in the closeness of rivalry that constrain the exporter's bargaining power. The extent of product differentiation and the position of the exporter's variety in the market become relevant for both reservation prices and cross-elasticities of demand. Although we make no assumptions about the goals behind price-setting (p_c) by CPE and LDC state organizations, we can still test the hypothesis that the scope for credible values of p_c is limited by competition.

5. Countertrade deals seem to involve substantial transaction costs of bargaining, verifying the qualities and attributes of the countertrade goods, and locating buyers for nonstandard merchandise. This property has testable implications for the terms of the deals and differences in the situations of novice and experienced participants.

3.   DATA SET AND PRELIMINARY TESTS

In order to test these hypotheses we secured information on a sample of 230 completed countertrade agreements from trading firms and producers in Vienna active in countertrade.[15] An information form soliciting information

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15.   It is desirable to sample both trading firms and exporters handling their own countertrade deals, because the two are apt to differ systematically in size of firm and transaction, access to in-house use of partner goods, and other ways (Lecraw, 1988; Welt, 1984, pp. 88-91).

on 37 aspects of each transaction was developed and pretested. Definitions

and concepts were reviewed carefully with each respondent, and answers were

checked for consistency and to minimize missing observations. The agreements

all took place after 1977, with 67 percent in 1986 and 1987. Individual

parties were not identified, but we know for each the geographic origin,

institutional type, and the Standard International Trade Classification (SITC)

numbers of the commodities exchanged.

Each respondent was asked to provide information on a representative

sample of the deals with which it had been involved. The sample, presumably

reflecting the proportions in the parent population, was dominated by

counterpurchase transactions (76.5 percent), with the rest divided between

barter (11.3 percent) and buybacks (12.2 percent). The goods exchanged are

mainly industrial: 87 percent of the exports and 60 percent of the partners'

goods are classified to SITC 5-7.[16]

Reflecting Vienna's role as intermediary in East-West trade, 86.5

percent of the countertrade partners are CPEs and members of the Council of

Mutual Economic Assistance (CMEA); the remaining 13.5 percent are LDCs.

State agencies are the countertrade partners in 85.2 percent of cases, with

the others divided between state-owned enterprises (9.1 percent) and private

firms (5.7 percent). The western partners are industrial firms mostly based

in the European Community (27.5 percent) and other industrial countries (66.8

percent).

The statistical analysis of the terms of trade in countertrade deals is

prefaced by a series of simple tests of association that shed light on the

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16. The properties of our sample seem similar to those of the only other
large-scale sample known to us, Jones and Jagoe (1988).

analytical framework and patterns in the transactions that are relevant to formulating the analysis of terms of trade.

Terms of Trade Components

It is useful to start with components of the terms of trade. The compensation ratio (CR) is defined as the value of goods to be purchased or obtained by the exporter divided by the value of the exporter's sale. The discount (D) is the markdown (gross of the trading firm's commission) required to market the countertrade goods. The product of these variables (CR*D) measures the overall markdown or discount accepted by the exporter relative to the value of the initiating sale.

We also obtained a direct evaluation by the respondent of the deal's outcome: a yes/no response to the question whether some or all of the gross discount was absorbed by the exporter (ABSORB = 1 if yes, 0 otherwise). It carries a clear interpretation in the analytical framework. If the exporter's price is known (publicly quoted), the intermediary monitoring the transaction can calculate directly whether CR*D involves a significant invasion of the exporter's gross revenue. Trading houses work closely with the exporters and should have accurate information on absorption of the discount. This is even more true of the in-house countertrade departments that supplied data.

The proportion of ABSORB = 1 observations is important for the proposed analytical framework. If countertrade occurred simply as an artifact of nonconvertible currencies, and the exporters were pure competitors, no absorption of discounts should have occurred. CR and D would represent unilateral choices made by the countertrade partners that we have no basis for explaining. In fact respondents judged the exporter had absorbed some

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discount in 52.2 percent of the transactions, had not in 32.6 percent (no response in 15.2 percent). Bussard (1987) also reported absorption in about one-half of the cases in his sample. A bargaining interpretation is clearly supported.

The associations among these indicators of the terms of trade potentially reveal something about relative bargaining power. Both positive and negative correlations between CR and D can be interpreted behaviorally. For example, a negative correlation is predicted if the exporter's opportunity-cost constraint (r_x) is fairly tight, so the counterpartner may be able to impose a high CR or a high D, but not both.[17] CR and D are in fact uncorrelated (0.02). However, only six transactions involve both high CR (≥ 1.1) and high D (> 15 percent). Apparently most exporters cannot freely adjust their prices to prevent the invasion of their profits by high values of CR*D.

Is the apparent value of the deal to the exporter related to ABSORB? One might expect the probability that the exporter gives up some surplus to increase with CR and D. However, only 40 percent of exporters were believed to have absorbed some of the discount when CR ≥ 1.1, while 65.5 percent did when CR < 1.1; the difference is significant at the 1.5 percent level. The same pattern appears with respect to D; with (the few) cases of D ≤ 0 deleted, the discount was partly absorbed in 57 percent of cases with D > 15 percent, but in 70 percent of cases with D ≤ 15 percent. These data

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17. D is a decision variable for the partner for two reasons. The asking price of a state trader is an administered price, in 77 percent of the sample according to respondents' judgments. Also, the partner commonly sets limits on the exporter's choice of counterpurchase goods and in that way can manipulate the partner's choices toward or away from those expected to require deep discounts (given their prices).

have a consistent interpretation: western exporters elect to accept sales revenues lower than their nominal prices only within narrow limits. A CPE or LDC trading agency that pursues policies mandating high values of CR and/or D obtains a deal only if the exporter's asking price is marked up to offset the exaction.[18] The result is consistent with exporters' concessions involving real invasions of their margins that are limited by opportunity cost.

Quality of Partners' Exportables

The descriptive literature agrees that partners' industrial goods offered for countertrade commonly fall below conventional western standards in quality, design, or performance (Banks, 1983; Fisher and Harte, 1985, p. 121). The theoretical relevance of their isolation from western commercial circuits was noted in the previous section. This hypothesis is supported only in part. With the quality of countertraded goods rated from "excellent" to "very poor," only 11 percent fall below average and 47.5 percent are rated above average. They falter more commonly in design (27 percent below western norms, which is almost half of those to which a design dimension applies), occasionally in technical standards (7 percent were outdated, which is 14 percent of those to which technical standards are applicable).

If low-quality partner goods are not prevalent in the samples, they are concentrated in deals of the counterpurchase type (20 of 24). Furthermore, quality is significantly related to the gross discounts that exporters experienced in disposing of counterpurchase goods (Table 1). Discounts

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18. A confirming pattern appears in the sizes of penalties on exporters for failure to complete their counterpurchases as scheduled. There is a statistically significant tendency for high penalties to be associated with low values of CR; that is, high penalties appear in agreements only when there will likely be little to penalize.

greater than 10 percent are significantly (10 percent level) more prevalent when design is below western standard (Table 1.1) or quality below average (Table 1.2). The small number of technically substandard products do not concentrate significantly in the heavily discounted transactions (Table 1.3).

Table 1 also includes cross-tabulations with ABSORB. Absorption of the discount is significantly more common when design is below standard, and when technical qualities are outdated (not statistically significant, however). This pattern is consistent with the hypothesis that countertrade partners offering goods that fall below western market standards have low incomes and reservation prices for western exports, making them likely beneficiaries of price discrimination. However, the expected pattern does not appear for product quality.

The explanation offered above for countertrade would fail if every commodity, whatever its attributes, could be priced by the market at a negligible transaction cost. Even organized commodity markets price only goods with certain restricted sets of attributes. The model's assumption about market information structures would be supported if those partner goods of types traded on organized exchanges obtain better treatment than those not traded on an exchange although they still face discounts. Table 1.4 provides mixed evidence: the existence of an exchange in unrelated to D, but exporters are significantly more willing to absorb discounts when the presence of an exchange-determined price reduces uncertainty.

Role of Experience

The repetition of transactions and the role of experience in countertrade hold interest because of (on the one hand) the transaction costs they seem to involve and (on the other) the theoretical implication that

specific deals are unlikely to be repeated if determination of the qualities of countertrade goods is the only issue. Certainly some western exporting firms have found themselves involved with countertrade deals often enough to develop their own specialized facilities to pursue them (Lecraw, 1988). The data base indicates whether a party exports the goods covered by the agreement regularly, occasionally, or now for the first time. Most transactions in fact involve parties who participate regularly in countertrade: 65.6 percent of the exporters, 59.8 percent of the partners. Only 14.5 percent of exporters and 8.9 percent of partners were active for the first time. The prevalence of repeated dealings is hostile to the component of the model that addresses revelation of the value of the countertrade goods and supports the price-discrimination hypothesis, which is fully consistent with repetition.

Inexperience is costly in that western entrants and occasional exporters are underrepresented in deals with $CR < 1$ while veterans are overrepresented (significant at 3 percent). No pattern appears for the countertrade partners. Neither group's experience is at all related to D. Veteran exporters absorb discounts in 58.7 percent of the cases and occasional exporters in 72.2 percent, but novices fall in between (61.3 percent), and the pattern is not statistically significant. However, countertrade partners who are occasional and novice exporters benefit from the absorption of discounts more often than do partners who are regular exporters (a weak tendency significant only at 0.25 percent). The only consistent rationale for this pattern is that customers with low reservation prices get favored treatment in the form of price discrimination.

Role of Short-term Disequilibria

Research has associated business reciprocity in the United States with short-run disequilibria in pricing and capacity utilization, implying that gaps between inflexible collusive prices and short-run marginal costs make sellers vulnerable to requests for reciprocal purchases. This short-run basis for exposure to concessions through countertrade seems less plausible for western members of international industries that chiefly offer differentiated products.[19] One might expect the hypothesis of price inflexibility to be irrelevant to most partner-country goods, but the descriptive literature does indicate that countertrade sometimes serves to evade agreements to maintain cartel prices, and fluctuations over time in partner-countries' demands for countertrade are correlated with foreign-exchange disequilibria.[20] The data base includes the respondents' judgments about whether the trends in prices of exporters' and partners' goods have been downward, steady, or upward. It also contains a judgment on whether the parties hold excess capacity or experience normal or excessive utilization rates.[21]

The results are largely negative. Of western exporters in rising-price markets only 25 percent accepted obligations to purchase goods subject to large discounts (D $\geq$ 10 percent), while 41.1 percent of those in falling-

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19. Only 36 percent of the transactions involve export of western goods that are standardized in both quality and design; 22.3 percent are standardized in only one dimension, 41.7 percent in neither.

20. See Banks (1983, p. 171), Group of Thirty (1985, pp. 18-20), Fisher and Harte (1985, pp. 96-97), Welt (1984, pp. 94-95), and Hammond (1990, pp. 34, 131-132).

21. Downward price trends were reported for 17 percent of exporters and 31 percent of counterpartners. Only 11 percent of exporters were judged to hold excess capacity, 14 percent of partners (but many observations are missing on the partners).

price markets did. The difference is as predicted but not statistically significant. For the partners' goods price trends are unrelated to the absorption of discounts. The western exporters' excess capacity affects values of both CR and D in perverse directions, although the patterns are not statistically significant.

4. DETERMINANTS OF TERMS OF TRADE

The terms of trade, reflected in CR*D and ABSORB, are now analyzed by means of multiple regression. Many of the predicted influences were mentioned in the preceding section, but only passing notice was given to competition, on which we now focus. Countertrade is basically a bilateral bargain between parties whose reservation prices yield some joint surplus to be divided. We expect each party's benefit to decrease with the closeness of competition that it faces and (given that) increase with the competition facing its transaction partner. As we noted above, this expectation emerges when we generalize the price-discrimination model to recognize that the seller free of close competitors, does better within the bargaining range defined by the parties' reservation prices.

Measuring Competition

The measures of competition in the data set rest on respondents' judgments about rivalry encountered by the trading parties in local and worldwide markets: (1) they face little competition worldwide; (2) little competition nationally, although substantial worldwide; (3) substantial both nationally and internationally. Also obtained was a judgment on the rank of each party in the world market: (1) a leading producer; (2) a significant

middle enterprise; (3) a follower firm. We can relate the terms-of-trade outcome to each party's discrete categories of market structure and competitive position. Also, designating its status as exporter (X) or partner (P), its competition level (C), and its rank (R), we treated the tranches of C and R as if they were cardinal and have equiproportional effects (XCR and PCR).[22] Parties with low values of C of course face little competition and should hence do better in countertrade deals. Because CR*D represents a concession for the exporter, it should increase with XC and decrease with PC.

The effect of market rank depends on one's hypothesis why competing firms differ in size. We assume that the firm's size is positively correlated with the value or quality of the goodwill asset that it possesses. A superior asset yields the firm a larger (less elastic?) demand at any given price, if the product is differentiated, or a lower level of variable cost.[23] Lower-ranked firms should face more effective competition so CR*D should increase with XR and decrease with PR. We suppose that the logic of seller competition applies equally to the investor-owned exporting enterprises exporters and the public-sector agencies and firms that typify the partners. That the latter group behave as ordinary market competitors is simply a refutable hypothesis.

Concentrated positions are much more prevalent among exporters than partners. Of the exporters 45.7 percent face little competition worldwide,

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22. Thus XCR = 6 for a fringe exporter in a locally but not globally concentrated industry or an intermediate firm in an unconcentrated industry.

23. Whether the benefits of these goodwill assets are social or only private and whether they result from rent-seeking expenditures are much debated questions in industrial organization, but the answers do not affect our positive analysis.

only 16.5 percent extensive competition both locally and internationally. For the partners the proportions are reversed: only 16.5 percent face little competition worldwide, while 50.4 percent encounter extensive competition. The same pattern appears in parties' ranks within their markets. The status of leading producer is enjoyed by 66.3 percent of the exporters, 13.9 percent of the partners. The status of fringe producer applies to 23.5 percent of the exporters, 67.8 percent of the partners. The pattern is strongly consistent with the price-discrimination hypothesis and also suggests that too few countertrade partners may possess market power to test its effect for them.

Information on Absorption

How can the analysis best utilize the variable ABSORB, which indicates when in the respondent's judgment some of D was absorbed by the exporter? Suppose that ABSORB = 0 accurately identifies cases in which the exporter obtains the same price as in non-countertrade transactions (with value-maximizing price discrimination taken into account). Then cases with ABSORB = 0 would provide no information on the effect of differences in competitive conditions, because either no differences exist or an unobservable p_x allows (some) exporters to avoid competitive bargaining over countertrade terms. The cases for which ABSORB = 1 would contain all the useful information on competitive forces. Different stories may apply to other regressors.

The device that we used to deal with this specification problem is to allow each regression coefficient of CR*D on a regressor to differ between the cases of ABSORB = 1 and ABSORB = 0. In the event none of the predicted difference appeared, for which we have no explanation. The determinants of ABSORB are considered directly after we report on the determinants of CR*D.

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Other Influences

The data set allows the testing of other influences on the terms of trade of the various types mentioned in the preceding section. Most of these flow directly from the analytical framework, although their testing involves somewhat tedious screening of alternative formulations for the two partners. Therefore we state the hypotheses briefly and confine detailed descriptions of their statistical embodiments to the positive results.

1. Exporters obtain lower benefits where the partner goods are of low quality or inferior design, indicating low ability to pay in the partners.

2. Trading partners suffering short-run excess capacity and/or falling price trends are placed in weak bargaining positions and therefore obtain poor terms of trade.

3. Experienced trading partners do better than parties inexperienced in marketing their goods to foreign customers. In conflict with this hypothesis is the evidence noted previously that inexperienced countertrade partners may be among the beneficiaries of price discrimination.

4. Because of information and transaction costs, exporters obtain better terms when they can use their partners' goods directly or market them locally. (This could be simply because other users value low-quality or nonstandard goods more than the exporters do.)

5. Product differentiation amplifies the effect of limited competition in improving a party's terms.

Regression Results

In reporting the results we proceed piecemeal, starting with the effect of competitive conditions and then adding other classes of determinants in sequence. There is little multicollinearity among the regressors, but missing

observations are a problem with some variables, and so a sequential approach preserves degrees of freedom without injecting substantial omitted-variable bias.

Because of the diverse theoretical predictions about the effect of market structure and a party's competitive position, we report in Table 2 a simple analysis that imposes the least possible functional form on the data. We regressed CR*D on dummy variables representing combinations of the market-structure and competitive-position classes, grouped to consolidate empty or nearly empty cells. Leading producers in the internationally concentrated industries (1,1) are the omitted class. Almost all signs are consistent with the hypothesis that a party obtains better terms of trade the more concentrated its industry and the higher its rank, implying positive (negative) coefficients for exporters (partners) in weaker positions and/or more competitive industries. For the exporters the slope coefficients increase as the number of competitors increases and as competitive position weakens, becoming significant in the most competitive situations. For the partners no such progression is evident, and none of the coefficients is significant.

With this limited evidence that both monopoly and leader status improve a party's bargaining position, we shifted to the simpler variables XCR and PCR, which treat the ordinal ranks of competition and position as if they were continuous variables. In Table 3, equation 3.1, the coefficient of XCR but not PCR proves statistically significant, and the model's explanatory power increased (F = 4.99 for equation 3.1, F = 2.23 for Table 2). If CR*D is factored into its components, both regressors significantly affect CR

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(equation 3.2) although neither influences D; this contrast is considered further below.

We next inquire whether the outcome depends on product differentiation, both as a structural attribute of the types of products exchanged and as ranks or positions of the parties' particular goods. In equation 3.3 the dummy variable XPDV = 1 for exporters' goods differentiated vertically by quality, XPDH = 1 for goods differentiated horizontally by design, and XPDVH = 1 for goods differentiated in both dimensions (0 otherwise). Although no coefficient is statistically significant, the signs suggest that differentiation (especially vertical) improves the exporter's position. In equation 3.4 the coefficients of corresponding dummies for the partners indicate that differentiation (especially horizontal) worsens their positions. That suggests effects of inferior quality or design of the partners' goods. The data base contains three variables that increase with the quality of the partner's goods: TECH = 1 for goods meeting western technical standards (0 = substandard); DESIGN = 1 for goods meeting western design standards (0 = below standard); QUAL increases with product quality (five classes).[24] When CR*D is regressed on these variables no significant result is obtained; when the dependent variable is factored into CR and D, the result for CR is the same as for CR*D, but for D we obtain equation 3.5. Low-quality goods correspond to higher discounts at the 1 percent level of significance. In terms of the model the fact that D is related to QUAL but not to any other variable indicates that P_c is typically set at the world price for goods of standard quality and not as a strategic variable in the exporter-

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24. We also assigned TECH = 1 and DESIGN = 1 to products for which these attributes are not applicable. Values of 1 indicate the "no problem" cases.

bargaining process. That implies, consistent with equation 3.1 and 3.2, that CR represents the principal focus of bargaining, and CR may be better explained than CR*D.[25]

The theoretical model assumes that countertrade transactions involve significant transaction costs; it raises the question whether they are repeated with some regularity, as is likely if price discrimination by the exporters is involved and/or repetition gives rise to learning or abates moral hazard. In equation 3.6 we include dummies indicating that a party (X or P) is only an occasional participant in (OC) or new entrant to (NE) countertrade activities, rather than a regular participant. If veteran participants obtain better outcomes, we expect positive coefficients for XOC and XNE, negative for POC and PNE. In equation 3.6, with CR as the dependent variable, the coefficients of XOC and XNE are positive and significant (one-tail tests), the latter at 10 percent. If CR*D is the dependent variable, these coefficients are insignificant.

Equation 3.6 also tests the hypothesis that a party's short-run situation of excess capacity or "soft" market prices influences how well it fares in the countertrade bargain. CAP indicates the extent of excess capacity (XCAP, measured only for the exporters). PRICE indicates the degree to which goods are subject to a rising price trend.[26] If excess capacity and falling prices denote weakness in bargaining over countertrade,

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25. We also note that product quality and the partners' competitive positions are significantly correlated, with the poorer-quality goods offered by partners in more competitive markets (R - 0.22) and with less dominant positions (R - 0.26). With D deceasing with QUAL and expected to decrease with PC and PR, the positive correlation of these latter variables with D obviously frustrates the expectation.

26. That is, PRICE - 1 if the price is declining, 2 if stable, 3 if rising.

the coefficients of XCAP and PPRICE should be positive and of XPRICE negative. None is significant and only PPRICE takes the right sign. Short-run conditions do not systematically influence countertrade outcomes.[27]

The effect of experience in countertrade transactions, shown in equation 3.6, is probed in another way in equation 3.7, where the region of origin of the exporter is controlled. Respondents to the survey indicated whether the exporter is a European Community enterprise (XEC = 1) or from a newly industrialized (XNIC = 1) rather from another western industrial country (mainly Austria, with some United States and Japan). One might expect firms based in newly industrialized countries to do less well, with competition and product differentiation controlled (coefficient of XNIC positive). In equation 3.7 the coefficient of XNIC is indeed positive and significant, and the coefficient of XEC is also positive (though much smaller) and significant at 10 percent (two-tail test). The result is unchanged if XCAP, XPRICE, and PPRICE are also controlled.

Equation 3.8 introduces a final consideration that may affect the countertrade bargain, the manner in which the exporter disposes of the partner goods that it receives. Respondents indicated whether these goods are used directly by the exporter (XUSE = 1), disposed of mainly in the exporter's national market (XSLH = 1), or disposed of in other countries (the residual case). Because diverse interpretations could be offered, we turn directly to the data. In equation 3.8 neither XUSE's nor XSLH's coefficient is significant, but there is a weak indication that exporters capable of using

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27. Chi-square tests show that for both exporters and partners rising (vs. declining) price trends are associated significantly (10 percent) with greater numbers of occasional or new transactions. The data are consistent with rising-price markets attracting more participants, who then enter into countertrade as novices.

the partner's goods directly obtain better deals than those who must dispose of them at arm's-length; with D as the dependent variable, these coefficients are significant at the 10 and 5 percent levels respectively. Controlling for DESIGN, QUAL, and TECH does not change this result. The negative effect of XUSE seems plausible; large western enterprises are probably not efficient users of low-quality inputs. We have no explanation for the positive coefficient of XSLH; if anything goods sold in third markets (developing countries) might be subject to higher quality discounts.

We mentioned above that the variable ABSORB had been put aside, because the data totally failed to support the theoretical expectation that the effect of competitive forces would be revealed in cases where the discount is absorbed and not in others (where the exporter's nominal price is presumably adjusted to offset it). With ABSORB = 1 for more than half the cases in the sample, this is an unsatisfying situation. We tried exploring the determinants of the binary variable ABSORB itself. The results were not revealing. There is a tendency (sometimes significant) for absorption to be more likely when the exporter is a dominant seller or operates in a concentrated market. However, essentially no other variables were significantly related to ABSORB in exploratory models except the short-run variables PRICE and CAP, and their signs were incorrect. The puzzle remains, not less because ABSORB rests on reasonably good information.

5. CONCLUSIONS

We can reflect on the empirical findings about countertrade in light of theoretical hypotheses about its bases--those hypotheses found in the previous literature and flowing from our own synthetic model. The price-discrimination

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model is supported by various incidental findings. The exporters possess a lot more market power than the countertrade partners, and better deals go to novice partners and those who presumably have low reservation prices. The price-discrimination model is really enveloped, however, by a more general model that identifies countertrade as a bargaining device for any customer facing an exporter who asks a price higher than its marginal cost. This model is well supported by the data, with the exporters' ability to insist on their asking prices and the partners' ability to demand concessions increasing with each party's market concentration and extent of market dominance.

A second traditional model that associates countertrade with short-run disequilibria in sticky-price markets receives no support.

A third model rests on partners' difficulties marketing goods of non-standard quality or design. This hypothesis receives limited support. Some, though not all, of the partners' goods do exhibit deficiencies in quality, technical properties, or design. Countertrade deals are themselves costly transactions, but they may still be least-cost ways for the partners to get their goods into western markets; notice, for example, the apparent efficiency of buyback and counterpurchase transactions in which the countertraded goods are used directly by the western exporters. The model of countertrade as a process for discovering the values of counterpartners' goods implies that this valuation involves a substantial fixed cost any way it is done; although that assumption is not tested directly, the evidence is all consistent with countertrade deals themselves having significant fixed costs. Nevertheless, we feel that the evidence lends rather more support to the discrimination and bargaining model than to the information model, mainly because of the extent of repetition of transactions and the role of learning shown in our results.

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Countertrade has taken on considerable importance in international trade, especially East-West trade, and for that reason we feel that these tests supply important new knowledge. The recent upheaval of political regimes in the main counterpartners and their probable shifts away from centrally planned economics structures throws the future of countertrade into question. We doubt, however, that the twilight of its importance is at all near at hand.

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Table 1. Relation of countertrade terms to qualities of countertraded goods

Qualities of goods	Discount percentage		Discount absorbed	
	< 10	≥ 10	Yes	No
1.1 Design of countertraded goods				
Below western standard	27	34	37	15
Equal western standard	40	26	27	30
Not applicable	53	33	49	25
Statistical significance[a]	10%		5%	
1.2 Quality of countertraded goods				
Below average	6	18	12	11
Average	49	39	55	23
Above average	65	37	47	36
Statistical significance	5%		n.s.	
1.3 Technical standard of countertraded goods				
Outdated	7	9	12	4
Equal western standard	62	35	51	27
Not applicable	51	49	50	39
Significance level[a]	n.s.		n.s.	
1.4 Effect of existence of exchange for partner's type of goods				
Exchange exists	16	13	22	2
No exchange	29	23	25	26
Significance level	n.s.		1%	

[a]Chi-square test performed on the applicable cells only.

Table 2. Effect of number of competitors and competitive position on
outcomes of countertrade transactions

Western exporter		Coefficient	Countertrade partner		Coefficient
Market concentration	Exporter's position		Market concentration	Exporter's position	
1	2,3	7.36^b	1	2,3	-2.67
2	1	-1.89	2	1,2	-1.53
2	2	1.68	2	3	-3.31
2	3	2.54	3	1,2	-1.51
3	1	6.02^b	3	3	-3.87
3	3	9.22^a			

Levels of statistical significance (one-tail test): a = 1 percent; b = 5 percent. The model's adjusted R^2 = 0.039, and the relation overall is significant at 6 percent.

Table 3. Determinants of terms of trade (and components) in countertrade transactions

Equation number	Regression equation

3.1 $CR*D = 6.83^a + 0.993^a$ XCR $- 0.252$ PCR
           (3.13) (3.08)   (0.89)

$$\bar{R}^2 = 0.037 \qquad F = 4.99^a$$

3.2 $CR = 83.39^a + 5.441^a$ XCR $- 4.391^a$ PCR
         (9.67) (4.25)   (3.90)

$$\bar{R}^2 = 0.122 \qquad F = 15.70^a$$

3.3 $CR*D = 8.20^a + 1.048^a$ XCR $- 0.254$ PCR $- 2.472$ XPDH $- 5.733$ XPDV
          (3.47) (3.19)   (0.86)   (0.97)   (1.50)

        $- 1.919$ XPDVH
         (0.99)

$$\bar{R}^2 = 0.036 \qquad F = 2.579^b$$

3.4 $CR*D = 8.95^a + 0.814^a$ XCR $- 0.203$ PCR $- 5.205^c$ PPDH $- 3.416$ PPDV
          (3.78) (2.46)   (0.70)   (1.83)   (1.60)

        $- 3.016$ PPDVH
         (1.26)

$$\bar{R}^2 = 0.046 \qquad F = 3.012^a$$

3.5 $D = 2.46 + 0.274$ XCR $- 0.218$ PCR $+ 0.7274$ DESIGN $- 3.482^a$ QUAL
       (0.66) (0.97)   (0.65)   (0.11)   (2.47)

       $+ 2.076$ TECH
       (0.55)

$$\bar{R}^2 = 0.031 \qquad F = 2.325^b$$

3.6 $CR = 87.84^a + 3.814^a$ XCR $- 3.389^a$ PCR $+ 18.218^b$ XOC $+ 14.762^c$ XNE
        (4.05) (2.58)   (2.60)   (1.84)   (1.31)

        $- 6.203$ POC $- 9.783$ PNE $+ 3.819$ XPRICE $+ 3.903$ PPRICE
        (0.72)   (0.72)   (0.57)   (0.67)

        $- 13.100$ XCAP
        (1.64)

$$\bar{R}^2 = 0.113 \qquad F = 3.631^a$$

3.7 $CR*D = 6.38^a + 0.848^a$ XCR $- 0.268$ PCR $- 1.639$ XPDH $- 3.763$ XPDV
          (2.64) (2.60)   (0.93)   (0.66)   (1.00)

$$- 0.429 \; XPDVH + 3.520^c \; XEC + 14.353^a \; XNIC$$
$$(0.22) \qquad\qquad (1.88) \qquad\qquad (3.59)$$

$$\bar{R}^2 = 0.093 \qquad F = 4.071^a$$

3.8 $\quad CR*D = 3.97 + 0.629^b \; XCR - 0.066 \; PCR + 3.304^c \; XOC + 2.459 \; XNE$
$\qquad\qquad (1.55) \;\; (1.91) \qquad\qquad (0.23) \qquad\quad (1.55) \qquad\quad (1.01)$

$$+ \; 3.116 \; XEC + 14.638^a \; XNIC - 3.041 \; XUSE + 2.863 \; XSLH$$
$$(1.60) \qquad\qquad (3.69) \qquad\qquad (1.51) \qquad\qquad (1.60)$$

$$\bar{R}^2 = 0.112 \qquad F = 4.305^a$$

Levels of statistical significance: a = 1 percent; b = 5 percent; c
= 10 percent. Tests are one- or two-tial as appropriate; see text.