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# **Food Manufacturing Cooperatives’ Overseas Business Portfolios**

**Steven Buccola, Catherine Durham,  
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Firms selling products overseas may do so in a wide variety of ways, such as through trading companies, foreign distributors, brokers, direct sales, license arrangements, and foreign direct investment. Many firms employ a portfolio of arrangements for each of their products. Using a share equation model, we examine the factors influencing food processing cooperatives’ foreign business arrangements. Particularly important are the cooperative’s financial resources and structure, risk exposure and risk preferences, information resources, and product types. Compared to investor-owned firms, we find that cooperatives have distinct disadvantages in investing or selling directly abroad, although the disadvantages are tempered by some equalizing considerations.

*Key words:* brokers, business arrangements, cooperatives, coventures, distributors, exports, foreign direct investment

## **Introduction**

As world incomes rise, the share of value-added goods in agricultural trade rises as well. For example, the proportion of processed foods in U.S. agricultural exports nearly doubled, to 58% of total value, between 1981 and 1996. U.S. food manufacturers have also expended an increasing portion of their resources in direct foreign investment. Between 1982 and 1993, food sales of the foreign affiliates of U.S. processors rose by 145%, and processed food exports from the U.S. rose by only 113% (Henderson, Handy, and Neff, p. 78). In 1994, sales of U.S. foreign affiliates stood at \$103 billion, while the value of U.S. firms’ processed food exports was only \$26 billion (Henderson, Sheldon, and Pick, p. 19).

The trade literature suggests decisions about overseas business activities depend greatly on the firm’s ownership, locational, and internalization advantages. Ownership advantages arise from patents, blueprints, or trade secrets which other firms do not have; locational advantages from the cheaper factor prices, superior consumer access, or similar virtues of geographical position; and internalization advantages from the efficiency gains of executing a given activity internally rather than in an arms-length transaction (Dunning). Decisions about whether to become involved at all in foreign markets seem most influenced by locational and ownership advantages, while choices

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about the arrangements under which overseas business should be conducted, and whether to further process one's products, appear most influenced by internalization advantages (Rugman).

In all three respects, world trends toward value-added sales and overseas investment appear to have cooperatives at a disadvantage to investor-owned firms. Reynolds, and Kennedy and Spatz, argue that investor-owned processing operations maximize the value added to raw product, or more specifically the return to the company's specialized product knowledge. Cooperatives, owned largely by their farmer-members, instead maximize the return to members' raw goods or fixed farm assets (see also Seipel and Heffernan). For this reason (as Cobia; Reynolds; and Reynolds and Spatz observe), co-ops often are hesitant about the equity-sharing aspects of many overseas ventures. Furthermore, because cooperative members' own expertise lies in farm production, they must hire specialized marketing services in order to integrate into overseas activities. The scarcity of these services commands a return which easily soaks up the gains from integration.

Not surprisingly, then, most U.S. cooperatives lag behind their investor-owned competitors in developing overseas marketing affiliates. From Reynolds and Spatz' (p. 8) sample of 23 U.S. marketing cooperatives, only one noted an investment in an overseas venture. In contrast, in a listing of 46 investor-owned U.S. food manufacturers, Henderson, Sheldon, and Pick (p. 23) reported 39 had foreign affiliate transactions.

The purpose of the present study is to examine factors influencing the business arrangements which U.S. agricultural cooperatives employ in their overseas sales. Factors of special interest are the cooperative's size, financial structure, international objectives, risk exposure, and products handled. We develop and estimate a share equation model showing how such factors are taken into account when the cooperative decides which portions of each of its products to allocate among the overseas arrangements available. In so doing, we provide important evidence about whether cooperatives indeed have a disadvantage in direct overseas marketing. Our emphasis is on value-added or highly processed foods, although some bulk commodities are included for comparative purposes.

To our knowledge, this is the first econometric analysis of a firm's sales arrangements portfolio. The previous empirical literature instead has focused on the binary question of whether firms conduct any international business, or on the potential substitutability, in a profit-maximization model, between foreign ownership and arms-length trade.

In an early study of 1,191 manufacturing enterprises, Horst found company size was the only factor driving the decision to invest abroad, while advertising expenditures, labor intensity, R&D expenditures, and product diversity were unimportant. Cavusgil saw moderate evidence that larger firms tend to be more "active" or "committed" to international operations than are smaller firms. Durham et al. found a firm's decision to begin exporting is correlated only with its size, although its decision to continue exporting is affected by exchange rates and prior shipments rather than by size as such. Both Wagner and Wakelin encountered similar results. Gopinath, Pick, and Vasavada concluded in a profit-maximization framework that U.S. food multinationals' foreign affiliate sales serve as a substitute for exports from the United States, although the magnitude of substitution is small. Pick et al. provide a survey of conceptual and practical issues in the global markets for processed food.

### Factors Likely Affecting International Business Arrangements

As Reynolds and Spatz and others have suggested, overseas business arrangements can be ordered according to the degree of commitment or involvement the firm makes in the international venture. Some manufacturers simply sell their goods to a trading company, which exports them under its own account. In that case, the manufacturer is virtually uninvolved with its overseas customers. Sales through a commission agent, on the other hand, such as through a foreign distributor or broker, require greater involvement because the manufacturer normally then keeps title to its product until the overseas reprocessor, wholesaler, or retailer purchases it. Although terminology is nonstandard, the term "distributor" most often refers to a firm which handles an exporter's overseas marketing, sales, and distribution on a long-term basis. In contrast, brokers typically make markets in the shorter term, provide fewer marketing services, and often leave the exporter to seek out its own new customers.

As a step toward further overseas involvement, a U.S. manufacturer may sell directly to overseas buyers, possibly through its own foreign office, bypassing commission agents. And beyond such exporter-importer relationships, it might enter into a licensing agreement (often called a "coventure") with a foreign firm, authorizing the latter to process food products abroad under the U.S. firm's label or technology. Finally, the U.S. firm can invest directly in a foreign manufacturing affiliate, either as a joint venture with the foreign firm or as a foreign subsidiary in which the U.S. firm holds majority interest (Henderson, Sheldon, and Pick). In the present analysis, we order overseas business arrangements as follows, from least to greatest involvement:

1. domestic sale to overseas trading company,
2. sale through a foreign distributor,
3. sale through foreign broker,
4. direct sale to overseas wholesaler or retailer,
5. overseas coventure, and
6. foreign direct investment.

To examine these arrangements, note that a cooperative often may use a variety of business arrangements,  $j = 1, \dots, J$ , for each product it handles. It must therefore choose, for each product  $i = 1, \dots, I$ , the proportion  $X_{ij}$  it wishes to sell under arrangement  $j$ . Reasonably, the cooperative would choose the  $I \times J$  arrangement proportions matrix  $\mathbf{X} = \{X_{ij}\}$  maximizing the expected utility of its net revenue  $R$ . Such choices depend on the firm's financial, technical, and organizational structure, the nature of the products in which it deals, the infrastructure in the countries in which it sells them, and the international supply and demand environment. Let  $\mathbf{Z} = \{Z_k\}$  be the  $k \times 1$  vector of such conditioning factors. Recognizing that, for each product, the business arrangement proportions must sum to one, the optimization criterion is denoted by:

$$\begin{aligned}
 (1) \quad & \underset{\mathbf{X}}{\text{Max}} E\{U[R(\mathbf{X}; \mathbf{Z})]\}, \\
 & \text{s.t.: } \sum_{j=1}^J X_{ij} = 1 \quad \forall i.
 \end{aligned}$$

This is a portfolio choice problem: the firm examines for each product the risk and expected net revenue of every available combination of business arrangements, and then selects the combinations best suiting its risk preferences.

A Coase-Williamson approach to the present problem instead would focus on transactions costs and on the moral hazards encountered in contract design. In Coase-Williamson-style models of vertical integration, for example, the firm chooses the extent of internalization of downstream marketing functions which minimizes the sum of contracting, monitoring, and negotiating costs, given all the internalization opportunities at its disposal (Caves, pp. 13–14). Because our own model focuses on all the firm's business risks, including those arising from yield and price variability as well as from opportunistic behaviors and other contracting costs, it essentially encompasses the Coase-Williamson approach as a special case.

In developing our hypotheses regarding factors  $Z_k$  that affect such choices, we assume growing international involvement typically increases the firm's risk and expected returns.<sup>1</sup> Increasing risk in equation (1) might be measured in a number of ways—for example, through a mean-preserving spread of the cooperative's net revenue probability distribution. For the sake of simplicity, risk will be represented in the present discussion by the net return variance, so that optimization can be characterized in mean-variance (EV) space. In figure 1A, business arrangements 1 through 5 (listed above), and an illustrative combination of them, are indicated on a hypothetical EV frontier (Robison and Barry; Menkhous et al.). Shown with the EV frontier is a representative iso-utility locus, giving the combinations of risk and expected return that provide the cooperative with constant expected utility. The expected-utility-maximizing cooperative, in this representation, would choose the combination of overseas arrangements at the tangency of the EV frontier and iso-utility locus.<sup>2</sup>

We are interested in factors affecting the positions of the EV or iso-utility curve, in turn altering the overseas business arrangements the cooperative finds optimal. The factors are divided here into five types: (a) elements of the cooperative's organizational structure which might affect members' risk exposure, (b) indicators of the cooperative's risk aversion, (c) factors correlated with the cooperative's size, (d) factors indicating the amount of international marketing information at the cooperative's disposal, and (e) factors indicative of the specialization of the co-op's product line.

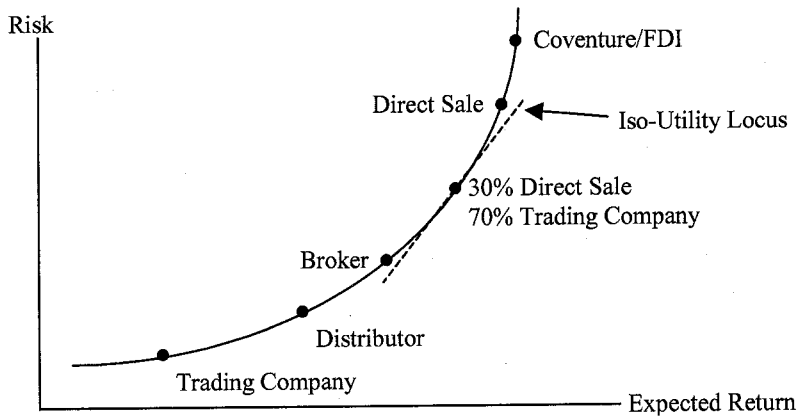
### *Structural Variables Affecting General Risk Exposure*

Unlike operational risks such as those connected with individual product lines or sales arrangements, risks associated with the cooperative's financial structure are not allocable, applying generally to all members and all co-op activities. Hence, any reduction

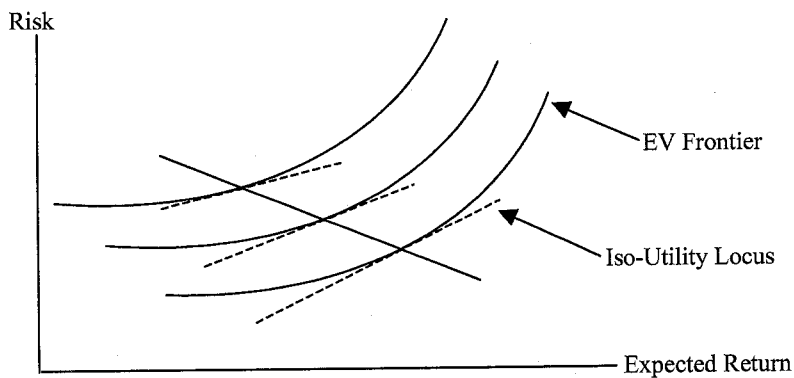
<sup>1</sup> Caves (pp. 69–72) similarly assumes that international entry mode influences expected return and risk, which in turn depend on the firm's size and experience.

<sup>2</sup> The literature on risky decisions contains extensive treatments of such issues as the structure and functional form of the decision maker's utility (risk aversion) function, the distribution of net returns, and the degree to which a risk measure represents the spread of that distribution. All these factors bear on the generality of characterizing the risky decision problem in variance-mean space. Such issues are ignored in the present discussion, if only because they take us beyond what we can adequately model with our data and econometric framework. It is useful to note that an EV or other risk-mean frontier may in some cases be negatively rather than positively sloped. By committing more resources to an overseas enterprise, the cooperative gains information about it and thereby reduces uncertainty. Total firm risk might therefore fall, depending on the risk characteristics of the cooperative's alternative investment opportunities.

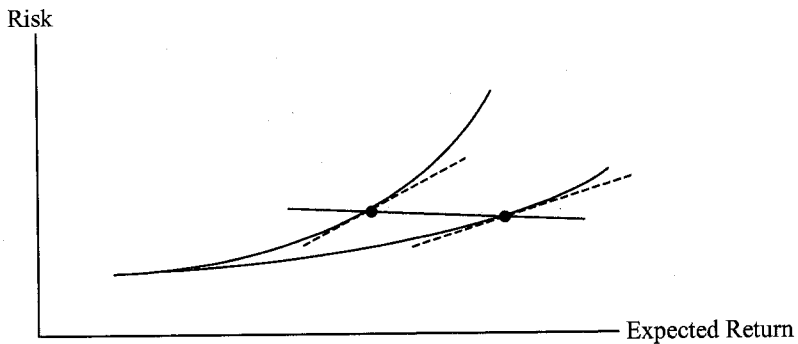
### A. Hypothetical EV Frontier



### B. Parallel Shift in EV Frontier



### C. Forward Tilt in EV Frontier



**Figure 1. Hypothetical EV frontiers and iso-utility loci for foreign business arrangements**

in these financial risks would shift the mean-variance frontier downward or to the right. Most empirical evidence suggests that business decision makers have decreasing absolute risk aversion; that is, their risk aversion declines as expected income or wealth rises (Saha, Shumway, and Talpaz). Iso-utility lines should therefore become steeper at higher expected incomes, bringing tangencies further to the right on the EV frontier, where overseas arrangements are more aggressive (figure 1B). Three structural factors affect the cooperative's unallocable risks: (a) its equity subscription plan, (b) its equity redemption plan, and (c) its pooling structure.

- *Equity Subscription.* Cooperatives subscribe equity from members either through a capital-retains system, wherein members are charged a fixed fee per unit or dollar of raw product delivered to the plant, or through a patronage dividend system, where members invest a stated percentage of their year-end net earnings. The capital-retains approach typically provides the cooperative with a more stable investment stream than do patronage dividends because product volumes tend to fluctuate less from year to year than do net revenues. To the extent this is so (and in commodities such as fruits and nuts, exceptions may occur), capital-retains financing removes a source of uncertainty to any domestic or foreign venture, shifting the EV frontier downward.
- *Equity Redemption.* Most of a cooperative's equity capital is allocated on the balance sheet to individual members, and hence ultimately is payable to them. Some cooperatives revolve this capital to members on a prearranged schedule, while others do so only at the board's annual discretion. Discretion-based revolving plans stabilize the cooperative's cash flow, thereby reducing the risks of its domestic or foreign investments.
- *Pooling Structure.* In a single-pool structure, total net revenues from the cooperative's multiple products are combined together, then allocated to each member in proportion to the value or quantity of raw product the member delivered to the processing plant that year. In a multiple-pool structure, in contrast, net revenues are divided into product categories or departments and allocated only to members who delivered raw goods in that category. Single-pool systems diversify a member's risks because the member's annual returns are based on the profit performance of all the co-op's products rather than only on the member's own (Buccola). Therefore, unless the returns of product subcategories are highly correlated with one another, member risks from any domestic or foreign venture would likely be lower in a single than in a multiple pool, implying the EV frontier would be lower as well.

#### *Variables Associated with Risk Aversion*

If the risk-return or EV frontier is positively sloped, lower risk aversion encourages the cooperative to become more involved in overseas marketing because the less risk averse the firm, the steeper the iso-utility lines. Eliciting direct measures of executives' or board members' risk aversion is difficult. Instead, we use as proxies for risk attitudes their stated objectives in conducting international business.

Three possible overseas objectives are considered: (a) increasing the firm's market share in some product line, (b) enhancing average sale price, and (c) reducing or diversifying risk. The first two objectives are consistent with comparatively low risk aversion because each involves investing capital to increase mean profit, with no explicit attention to risk. The third objective is indicative of comparatively high risk aversion. Thus, we expect the first two objectives to be associated with more direct overseas marketing efforts and the third with less direct methods.

#### *Variable Associated with Size*

The principal goal of most marketing cooperatives is to provide an initial handling and processing facility for its members' farm products. Further processing and overseas activities typically are a secondary consideration. The greater the cooperative's financial resources, then, the more it would be expected to engage in international business. This conjecture is supported by Dubin's finding that larger firms are more likely than smaller ones to expand overseas through new ventures rather than through acquisition. Greater resources tip the right end of the EV frontier downward by reducing the cost of investment funds and hence enhancing the relative expected returns of overseas ventures (figure 1C). As a result, cooperatives with larger assets would seem more likely to employ more direct overseas arrangements, such as coventures and direct investment, than would those with smaller assets. A firm's financial resources are represented in this study by 1998 gross sales revenues.

#### *Variables Associated with Information Resources*

Like financial resource variables, factors enhancing the cooperative's information about its overseas markets should flatten the mean-variance frontier because they reduce the risk and raise the relative expected returns from direct overseas involvement. Consequently, they too should encourage the co-op to employ more direct overseas arrangements. Perry argues along similar lines that as its uncertainty diminishes, a firm becomes less inclined to use intermediaries. Caves (p. 71) cites evidence showing firms with greater overseas experience pursue more aggressive overseas strategies, such as the establishment of new subsidiaries.

Two variables are employed here to represent a cooperative's overseas information: (a) the number of years in which it has engaged in international business, and (b) its propensity to conduct international business, as measured by the ratio of its export or foreign affiliate sales to total revenue. The international propensity ratio likely reflects the cooperative's international size economies as well as information resources. The greater its overseas revenues, the lower might be the unit cost of investing more directly in overseas marketing such as through direct sales or foreign investments.

#### *Variables Associated with Product Specialization*

A firm has an incentive to market its own products, rather than hire agents to do so, to the extent it has a comparative advantage in understanding its own product line. One would expect the comparative advantage to be greater as the firm's products become



more specialized. Hence, cooperatives exporting specialized goods overseas would more likely be directly involved in overseas marketing than are co-ops selling generic goods (Perry). Like financial and information resources, product specialization should tip the right end of the EV frontier downward because a firm's product information advantage should reduce its risks and increase its expected net returns from more direct overseas marketing efforts (figure 1C). Indeed, product specialization likely serves as an additional proxy for a cooperative's information advantage in international activities.

Three binary variables are employed here to reflect product specialization: (a) one indicating whether the cooperative's principal line of business is in retail-packaged goods rather than bulk-packaged commodities, (b) a second indicating whether the cooperative's principal business is in highly processed rather than raw or slightly processed goods, and (c) a third indicating whether the cooperative maintains a retail brand in a foreign country. Retail packaging, extensive processing, and foreign branding all should be associated with greater product specialization. Highly processed goods, however, are not necessarily retail-packaged or branded. For example, some cooperatives may export processed goods for repackaging and relabeling overseas, or export value-added ingredients for further processing.

### Empirical Model and Statistical Profile

Rather than model the portfolio choice explicitly, we concentrate on the reduced form. That is, we observe the business arrangement portfolio matrix  $\mathbf{X} = \{X_{ij}\}$  the cooperative has chosen for a particular good and ask how these choices would vary if conditioning factors  $Z_k$  ( $k = 1, \dots, K$ ) were to vary. The reduced-form model is specified as follows:

$$(2) \quad X_{ij} = X_{ij}(Z_1, \dots, Z_K) \quad \forall i, j;$$

$$(3) \quad \sum_{j=1}^J X_{ij} = 1 \quad \forall i.$$

This framework permits us to estimate how changes in a particular factor  $Z_k$  influence the entire spectrum of business arrangements utilized for a given product. In particular,  $Z_k$ 's marginal impacts on the arrangements employed for the  $i$ th product are:

$$(4) \quad \frac{\partial X_{i1}}{\partial Z_k}, \frac{\partial X_{i2}}{\partial Z_k}, \dots, \frac{\partial X_{iJ}}{\partial Z_k} \quad \forall i,$$

where, because  $\sum_j X_{ij} = 1, \forall i$ , we must have

$$(5) \quad \sum_{j=1}^J \frac{\partial X_{ij}}{\partial Z_k} = 0 \quad \forall i.$$

Because U.S. cooperatives handle so many different sorts of goods, we can estimate model (2)–(3) only for a representative product, namely by pooling observed proportions  $X_{ij}$  ( $i = 1, \dots, I$ ) into a single regression for each of the  $J$  business arrangements. The estimating model then becomes  $X_j = X_j(Z_1, \dots, Z_K)$ , where  $j = 1, \dots, J$ , and  $\sum_j X_j = 1$ .

**Table 1. Summary Statistics, by Cooperative Utilizing Foreign Business Arrangement**

Description		Foreign Business Arrangement			
		Trading Company	Foreign Distributor	Foreign Broker	Direct Sales/ Coventures/ Direct Investment
No. of Co-ops Using Arrangement		12	13	17	12
1998 Gross Sales (\$ mil.)	Mean	204.36	214.31	385.84	168.37
	Min	11.22	2.42	0.10	0.10
	Max	803.90	1,119.50	2,450.00	704.55
No. of Members	Mean	1,144	27,238	2,842	4,569
	Min	25	5	15	14
	Max	7,308	340,000	31,411	39,000
Co-ops with Domestic Brands (%)		67	77	71	75
Co-ops with Foreign Brands (%)		33	38	35	17

Note: The number of cooperatives in the sample is 31.

### *Survey Instrument*

Data were collected from a survey of U.S. agricultural processing/marketing cooperatives. We asked the cooperatives to indicate how and in what volumes their products are sold abroad, how frequently they have changed these arrangements in recent years, and what their sales plans are for the future. In cases where the cooperative participates in foreign coventures or invests in foreign affiliates, we solicited such details as the nature of the coventure relationship, the proportions of the cooperative's business allocated to direct investments, and the terms under which cooperative membership might be offered to foreign farmers. We also investigated the firms' purposes in conducting international business and the manner in which their overseas arrangements have conformed with these purposes.

The survey instrument was mailed to 90 cooperatives, and follow-up contact was made with most of them by telephone. Forty-six responses were received, of which 31 were complete enough to be usable, representing an effective response rate of 34%. A profile of the firms, stratified by foreign business arrangement used, is given in table 1. Each number in this table represents every cooperative utilizing the indicated arrangement for at least some transactions of some of its products. Thus, a cooperative utilizing several arrangements is represented in multiple columns of the table. Because direct sales, coventures, and direct investment were comparatively infrequent, they were combined into a single category.

With nearly 8,000 members and 1998 gross sales of \$243 million, the average respondent was larger than a typical U.S. cooperative. However, a wide variety of cooperative sizes is represented, ranging from less than a half million to over a billion dollars in 1998 sales. Surprisingly, co-ops selling directly or through coventures or direct investment are among the smallest firms in the sample, suggesting many are targeting foreign niche markets rather than exploiting size economies. Most firms are well established in the domestic market: two-thirds to three-quarters of them maintain domestic brand

names, regardless of overseas business arrangement. About one-third of the sampled co-ops have foreign brands, although in the direct sales/investment category only 17% do. Products include animal feed, seed, grain, beans, frozen seafood, cheeses and other dairy products, poultry, nuts, and fresh and processed fruits and vegetables.

### *Statistical Profile*

Many cooperatives conduct international business differently in one product than in another. For example, consider a cooperative which sells 30% of product #1 through a broker and 70% through a foreign coventure, and 70% of product #2 through a broker and 30% through coventure. An analysis at the firm level would require averaging these percentages across products, giving (in the present unweighted example) 50% through a broker and 50% through coventure. Much of the important variation in business arrangement choice would then be lost. For this reason, we observe separately the arrangements employed for each product in each firm. To each such product and business arrangement we match the cooperative's export-to-total sales revenue, years of international experience, foreign business objectives, and other firm-level factors discussed above, in addition to such product-specific factors as whether the goods are processed and whether they are retail-packaged. In a cooperative with two products, each of which is marketed under two business arrangements, we would therefore have four observations available for analysis.

Table 2 provides these product-level means, stratified by overseas business arrangement. The top row of the table gives the sample size in the respective arrangement. For example, 25 products were sold at least partially through a trading company, 31 at least partially through a foreign distributor, and 27 at least partially through a foreign broker. The 31 responding cooperatives reported trading internationally in 59 products. Because many products are sold through multiple arrangements, the sum of the first four numbers in this top row (99) is greater than 59. In particular, the typical product was sold under  $1.7 = 99/59$  arrangements. Column 5 of table 2 gives the product-level means of the total (unstratified) sample. In column 6, we list for comparative purposes the sample means corresponding to the portion of column 4 that consists only of coventures and direct investments, namely the portion which excludes direct sales.

As table 2 shows, 68% of the products sold through trading companies are from cooperatives using the capital-retains method of subscribing member equity capital. Only 37% of products sold through distributors are capital-retains financed, while 63% of products sold through brokers and 63% sold directly or through coventures and foreign affiliates (column 4) are capital-retains financed. Thus, the sample means alone do not suggest strongly that capital-retains financing encourages overseas involvement, although 100% of the firms involved in coventures or direct foreign investment (column 6) did use capital retains.

The impact of single-pool structures on a cooperative's willingness to take overseas risks does not appear to be any stronger. Twenty-eight percent of products sold through trading companies are from co-ops which diversify member incomes by allocating them through a single pool. Contrary to our expectation, the incidence of single-pooling drops to around 22% in distributor and broker arrangements. On the other hand, 37% of products marketed directly or through coventures or foreign affiliates (column 4) are from single-pool co-ops, suggesting single pools might encourage international risk-taking to some extent.

**Table 2. Summary Statistics, by Product Utilizing Foreign Business Arrangement**

Description		[1]	[2]	[3]	[4]	[5]	[6]
		Trading Company	Foreign Distributor	Foreign Broker	Direct Sales/ Coventures/ Direct Investment	Total Sample	Coventures/ Direct Investment
No. of Products Using Arrangement		25	31	27	18	99	8
% Financed through Capital Retains		68	37	63	63	49	100
% with Equity Redemption Plan		68	84	75	58	70	87
% with Single Pool		28	23	22	37	25	37
% with Market Share Objective		72	90	78	79	71	100
% with Price Objective		72	64	89	74	75	87
% with Risk-Diversification Objective		68	77	63	32	58	62
1998 Mean Gross Sales (\$ mil.)		161.46	150.23	334.25	129.15	230.01	205.01
Yrs. of Foreign Experience	Mean	18	19	29	26	24	34
	Min	5	2	5	6	2	16
	Max	50	50	60	70	70	70
Foreign Propensity: [(Foreign Revenue ÷ Total Revenue) × 100]	Mean	29	22	33	31	27	36
	Min	1	0	1	5	0	5
	Max	85	52	85	65	85	65
% Retail-Packaged		92	74	78	74	76	75
% Processed		64	74	74	58	71	37
% with Foreign Brand		32	29	26	10	22	25

Cooperatives were allowed on the questionnaire to list more than one international business objective. The mean percentages of those citing the relatively aggressive "market share" objective in table 2 appear to vary little by sales arrangement, except that a rather high 90% of those selling through a foreign distributor said their aim was to increase market share. Interestingly, although 79% of cooperatives in the combined direct-sales/coventures/investment category (column 4) cited a market share objective, everyone selling through a coventure or foreign affiliate (column 6) listed that objective. Nearly 90% of those selling through a broker cited "enhancing sale price" as an objective, while only 64% to 72% of those using a trading company or distributor did so. Consistent with our hypothesis, the relatively unaggressive goal of diversifying risk was cited more often in connection with the use of trading companies and distributors than it was in connection with the use of brokers or direct sales/coventures/foreign investment.

Cooperatives' propensities to conduct international business—as measured by their international-to-total sales ratios—average from 22% to 33% in table 2, differing little across business arrangement. Years of international experience do differ by arrangement. Goods sold through trading companies or foreign distributors are from cooperatives with a product-weighted average of only 18 to 19 years of foreign experience, while those sold through brokers or more direct means are from co-ops with a product-weighted mean of 26 to 29 years of experience. Indeed, the mean foreign experience of firms selling through coventures or direct investment alone (column 6) is 34 years, and the minimum experience is 16 years. By contrast, the least-experienced cooperative using a foreign distributor has had only two years of overseas experience.

Surprisingly, the percentage of goods sold through trading companies that is retail-packaged (92%) is higher than the retail-packaged percentages (around 75%) in the other business arrangements. The percentage of goods sold in processed form does rise as the co-op moves across the involvement spectrum from trading company to distributor and broker, but declines when moving further into direct sales and investment. Twenty-four percent of products surveyed have foreign brands, a percentage that declines somewhat as business involvement grows.

### **Econometric Analysis**

Although these sample means give a flavor of the questionnaire responses, they do not allow us to consider the effect of changing one factor while the others are held constant. To do so, we fit share equation model (2)–(3). Four share equations are estimated, one each for trading company, distributor, and broker, and a fourth that includes coventures, direct overseas sales, and direct foreign investment (column 4 of table 2). Because the sum of a given product's business arrangement shares is unity [equation (2)], one equation is redundant. In the linear model employed here, the slope coefficients of the redundant equation are calculated from equation (5) and the intercept from equation (3). Share equations are estimated with seemingly unrelated regressions. Since explanatory variables  $Z_k$  are the same in each equation, this reduces to ordinary least squares estimation (Greene, pp. 616–17).<sup>3</sup> Sample sizes of each equation are given in the top row of table 1.

In the initial regressions, all explanatory factors shown in table 2 were included together. Only about one-half of them were statistically significant in a consistent way as equation specifications were altered. Subsequent analysis of the correlations among groups of explanatory variables indicated that pronounced multicollinearity was the source of much of the nonsignificance. Using auxiliary regressions, we then selected variables from each of the five categories (detailed earlier) and checked each combination for statistical significance and goodness of fit. Final results, shown in table 3, are those with the highest overall significance and greatest robustness to specification changes. Results were unaffected by arbitrary choice of the redundant equation.

As can be seen from table 3, eight factors were most significantly associated with choice of business arrangement: the cooperative's use of capital-retains financing; executives' indication of a market share, sales price, or risk-diversification objective; the cooperative's export experience and export propensity; and the retail-packaged or processed nature of the product. At the 10% confidence level, just over half of these factors significantly differ from zero. The  $R^2$ 's range from 0.61 to 0.35, moderately high for cross-sectional survey data. The cooperative's size as measured by 1998 total sales revenues, the use of a single pool, and ownership of a foreign brand were consistently

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<sup>3</sup> Some explanatory variables in this study (e.g., the ratio of the firm's international to total sales) may be simultaneously determined with business arrangement shares. Ruling out simultaneity through, for example, a Wu-Hausman test, would require an instrumental variable regression for each explanatory variable. Because some of our conditioning variables are binary and others continuous, assumptions about the error term distributions in such regressions would be quite complicated and a Wu-Hausman type test likely misleading. We therefore opted not to pursue simultaneity testing in any formal way.

Table 3. Foreign Business Arrangement Share Equations, Four-Way Partition

Explanatory Variable	Variable Definition	Foreign Business Arrangement				Direct Sales/ Coventures/ Direct Investment
		Trading Company	Foreign Distributor	Foreign Broker		
Intercept		0.508*** (0.099)	0.456*** (0.106)	-0.047 (0.123)		0.083 (0.109)
<i>Capital Retains</i>	1 if equity subscribed through capital retains, 0 otherwise	0.338*** (0.082)	-0.484*** (0.088)	-0.131 (0.102)		0.277*** (0.090)
<i>Market Share</i>	1 if objective is to enhance market share, 0 otherwise	-0.243** (0.097)	0.303*** (0.104)	-0.288** (0.121)		0.238** (0.107)
<i>Mean Price</i>	1 if objective is to enhance average sales price, 0 otherwise	0.077 (0.103)	-0.445*** (0.110)	0.081 (0.128)		0.287** (0.114)
<i>Diversification</i>	1 if objective is to diversify risk, 0 otherwise	0.166* (0.095)	0.186* (0.102)	-0.025 (0.119)		-0.327*** (0.105)
<i>Foreign Experience</i>	Number of years firm has been in international business	-0.012*** (0.003)	-0.004 (0.003)	0.019*** (0.004)		-0.003 (0.003)
<i>Foreign Propensity</i>	Ratio of 1998 foreign revenue to total firm revenue (expressed as decimal)	-0.308 (0.215)	0.483** (0.230)	0.078 (0.268)		-0.253 (0.238)
<i>Retail-Packaged</i>	1 if product is retail-packaged, 0 otherwise	0.215** (0.087)	-0.375*** (0.092)	0.162 (0.107)		0.001 (0.095)
<i>Processed</i>	1 if product is processed, 0 otherwise	-0.017 (0.089)	-0.027 (0.095)	0.186* (0.110)		-0.142 (0.098)
$R^2$		0.492	0.611	— <sup>a</sup>		0.346
Dependent Variable Mean		0.25	0.31	0.28		0.16

Notes: Single, double, and triple asterisks (\*) denote significance different from zero at the 10%, 5%, and 1% confidence levels, respectively. Dependent variable is percentage of product sold abroad under the indicated arrangements. Numbers in parentheses are standard errors. Arrangement-specific sample sizes are shown in the top row of table 2. Degrees of freedom for the SUR  $t$ -tests are 59 - 9 = 50. Explanatory variable means are given in table 2.

<sup>a</sup> Broker was employed as the base group. Its slope coefficients were computed so that each slope row sums to zero, and its intercept so that the intercept row sums to unity.

nonsignificant factors in business arrangement selection. Those variables are not included in the final model.<sup>4</sup>

The principal use of table 3 is to compare a given factor's slope coefficients across alternative business arrangements. Following our discussion above, we hypothesize that all but the risk diversification variable will be positively associated, *ceteris paribus*, with greater overseas involvement. The slope coefficients of those variables should therefore rise algebraically (become less negative or more positive) as one moves across the involvement spectrum from trading company to direct sales/coventure/investment. That is, the equation (3) derivatives should rise algebraically from left to right. Slope coefficients of the risk diversification variable should instead decline algebraically from left to right.

We see this occurring in table 3 in many, but not all, cases. As an example of a result conforming to our expectations, the presence of a risk-diversification objective does inhibit overseas involvement: cooperatives wanting to reduce risk sell close to 18 percentage points more product each through trading companies and foreign distributors, 2 percentage points less through brokers, and 33 percentage points less through direct overseas contacts than do those co-ops not citing a risk-diversification objective. These results are consistent with evidence that diversified firms tend to pursue more aggressive overseas strategies than do their undiversified counterparts (Caves, pp. 71–72).

Contrary to our expectation, the presence of capital-retains financing increases by 34 percentage points the mean share of product sold through trading companies. However, ignoring trading company sales, capital-retains financing does encourage more direct overseas involvement. It reduces the share of product sold through a distributor by 48 percentage points and through a broker by 13 points, and raises the share sold directly or through coventure/investment by 28 points. A price-enhancement objective has no significant effect on the share of product sold through trading companies. But as expected, it substantially reduces the share sold through distributors, increases the share sold through brokers, and increases even more the share sold directly or through coventure/investment.

Patterns among other coefficients in table 3 are less clear. Indeed, the expectation that they uniformly decrease or increase with business arrangement may be asking too much of our data and conceptual reasoning. To reduce such demands, we next combine trading company with foreign distributor arrangements, and foreign brokerage with direct sales/coventures/investments. This is a reasonable partition because distributors often take responsibility for many of the same overseas marketing details as those assumed by trading companies, while brokers typically leave to the exporter much of the research, planning, and responsibility for international sales. Durham and Lyon similarly distinguish between direct and indirect export modes, the former being those in which ownership is maintained during transit.

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<sup>4</sup> We examined our sample cooperatives' Port Import and Export Reporting Service (PIERS) data to identify the countries to which they export directly. Eighteen cooperatives from the sample were identified in the 1998 data. Two of the 18 shipped to 40 or more countries, with one of them exporting entirely through a broker, and the other through a combination of brokers (90%) and direct investment (10%). The only cooperative that had exported for more than 50 years sold its products only through direct sales and direct investment. Cooperatives shipping to fewer than 20 countries tended to sell to developed nations or to those dependent on trade for food staples, such as in Western Europe or in the more developed part of the Pacific Rim. Such findings suggest the sample cooperatives tend to invest or sell directly in markets which are well developed, reserving indirect sales for less developed markets. We found it infeasible in our questionnaire to elicit data on each product's countries of destination.

**Table 4. Foreign Business Arrangement Share Equations, Two-Way Partition**

Explanatory Variable	Foreign Business Arrangement	
	Trading Company/ Distributor	Broker/ Direct Sales/ Coventures/ Direct Investment
Intercept	0.963*** (0.122)	0.037 (0.122)
<i>Capital Retains</i>	-0.146 (0.101)	0.146 (0.101)
<i>Market Share</i>	0.060 (0.120)	-0.060 (0.120)
<i>Mean Price</i>	-0.368*** (0.127)	0.368*** (0.127)
<i>Diversification</i>	0.352*** (0.118)	-0.352*** (0.118)
<i>Foreign Experience</i>	-0.016*** (0.004)	0.016*** (0.004)
<i>Foreign Propensity</i>	0.175 (0.267)	-0.175 (0.267)
<i>Retail-Packaged</i>	-0.163 (0.107)	0.163 (0.107)
<i>Processed</i>	-0.043 (0.110)	0.043 (0.110)
$R^2$	0.56	0.56
Dependent Variable Mean	0.56	0.44

Refer to "Notes" to table 3. The cross-equation restrictions imply that standard errors of coefficients and  $R^2$ s are equal across business arrangement group.

Regression results using the two-way partition are shown in table 4, where again intercepts sum to unity and slope coefficients to zero. Our hypotheses argue that every slope coefficient in the trading company/distributor column of table 4, except for risk diversification, should be negative (and in the right column they should be positive), implying an increase in the factor reduces reliance on trading companies and distributors and increases reliance on brokers and more direct arrangements. As table 4 reports, these expectations are borne out for all but the *market share* and *foreign propensity* variables, whose *t*-values are so small as to suggest instead a zero effect. The failure of foreign propensity to explain very much in a two-way partition is consistent with its significance only in the distributor regression in table 3. The failure of the market share objective in table 4 instead comes from the unevenness of its impacts in table 3, where it significantly increases the use of trading company and brokerage arrangements even as it discourages distributor and direct sale/coventure/investment arrangements. Although the sign on the *processed* variable is correct, its *t*-value also implies a zero effect.

In every other case, our hypotheses are satisfied. Capital-retains financing, a price-enhancement objective, foreign experience, retail packaging, and processing are all



associated with greater overseas involvement, although the significance of the *capital retains* and *retail-packaged* variables is only at the 15% level. Risk-diversification objectives are associated with low overseas involvement. The absolute values of these effects tend to be smaller than the corresponding values in table 3 (of which they essentially are the averages), since coefficient signs in the trading company and distributor equations in table 3 often are opposite one another, and in the broker and direct sales equations sometimes are opposites as well.

The *foreign experience* coefficient in table 4 reveals an additional year of international experience increases the cooperative's direct-marketing portfolio share by 1.6 percentage points. At sample means, the corresponding elasticity is 0.98, i.e., 1% more experience raises the direct marketing portfolio share by about 1%. Thus, consistent with Dubin and others, cooperatives appear to operate on a learning curve in the sense that experience does reduce risk, increasing the propensity to engage in more aggressive overseas strategies. Remarkably, the positive effect of retail packaging on foreign involvement is the opposite of that suggested in table 2, where the percentage of product that is retail-packaged tends to decline with greater involvement. This finding underscores the usefulness of share regressions which, unlike summary statistics, characterize factor effects in a *ceteris paribus* environment.

## Conclusions

We have argued that a firm's overseas trading arrangements can be ordered according to degree of marketing involvement and that some firm- and product-specific factors are more conducive to such involvement than are others. After considering a wide variety of factors in U.S. food manufacturing cooperatives, we find the most important to be the firm's capital subscription methods, marketing objectives, and foreign experience and propensity, and the packaged or processed character of the product. The influences of these factors on product shares sold through trading companies, distributors, brokers, and direct sales or investments are statistically often very strong. Furthermore, factor effects are ordered across the involvement continuum in a way generally conforming to our expectations, although the exact patterns of the orderings are rather diffuse.

Several of the orderings suggest cooperatives do have disadvantages in overseas markets. For example, risk aversion—as proxied by market share, price, and diversification objectives—appears to be a significant factor in discouraging the extent of international involvement. Because co-op members already are exposed in their farming operations to substantial yield and input price risk, they likely are less disposed than are nonfarm investors to assume the additional risks of an international operation. The impact of capital-retains financing on incentives for direct overseas operations is itself a warning signal about comparative disadvantage. Capital retains may provide the cooperative with a more stable equity base than do patronage refunds, but for the same reason expose the farmer/member to greater cash flow risk. One cost, that is, of a more activist international marketing effort, is the potential destabilization of an already risky farm cash stream.

The positive effect of foreign experience on overseas involvement (and less convincingly the effect on involvement of foreign propensity as measured by overseas-to-total sales revenues) is, however, a source of some encouragement. Experience and revenue evolve with time. In this respect, the cooperative competes on the same terms as do investor-owned firms: information needed for reducing overseas marketing risks can be

acquired only by becoming involved in overseas markets, and necessarily taking some initial risks. Our results strongly suggest cooperatives take such risks in the ordered, incremental way one would expect. Indeed, the generally rising marginal impact of the *foreign experience* variable across the involvement spectrum in tables 3 and 4 is perfectly consistent with Cavusgil's argument that firms progress gradually from an "experimental" to an "active" to a "committed" stage in international operations.

Having said this, we are impressed with the difficulty of making generalizations about cooperatives' international sales arrangements. The heterogeneity of firm size, financial structure, product mix, processing extent, geographic market, and sales arrangement in our sample is so great that any effort to rationalize them all inevitably collides with model and data deficiencies. For example, because nations differ in institutional infrastructure and the cost of property rights enforcement, business arrangement choice likely depends on a product's country of destination. Had it been feasible to record destinations by product, this additional factor might have been taken into account. Questionnaire answers are, as well, inherently noisy because respondents may interpret important questions differently, and such misunderstandings cannot easily be resolved when the sample size is large.

On the decision-to-invest question, Horst observed the same difficulty nearly three decades ago:

There exist a significant number of firms with apparently similar characteristics which have come to opposite conclusions regarding the desirability of investing abroad. If our theory were more precise [and] our data more complete and reliable, ... the apparent discrepancy between theory and reality would doubtless be diminished. But even then, I suspect, a substantial portion of the sample variance would still be unexplained (pp. 264-65).

Improving our models of business arrangement portfolio choice will require more effective ways of eliciting technology and resource information from large samples of firms.

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