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The authors develop a transaction cost analysis model designed to explain the channel integration choices of firms in international markets. In a test with data collected from a group of Canadian export firms, the model receives significant support, suggesting that an important contingency when deciding on channel structure in a foreign country is the ability of the market to limit the opportunistic tendencies of outside intermediaries. When the enforcement of contractual arrangements cannot be relied upon in the market, different degrees of forward integration are feasible alternatives. Other empirical results suggest that the firm may prefer use of intermediaries in a foreign market with high environmental diversity in order to cope with its inherent complexity and maintain flexibility. Channel volume, the use of shared channels, and country destination also are shown to affect the nature of integration in channels in international markets.

A Transaction Cost Analysis Model of Channel Integration in International Markets

Doing business in international markets is a difficult challenge for any firm (cf. Cavusgil 1980; Root 1987). Especially difficult is deciding what levels of integration the firm should use within its channels of distribution in various foreign markets. At one extreme, the firm can perform all marketing and distribution functions itself. At the other extreme, the firm can choose not to perform any of the necessary functions, instead using outside merchants who take title to the firm's goods for resale to other middlemen and final buyers. Between these extremes, a continuum of market hierarchy options is usually available (cf. Anderson and Gatignon 1986).[1] Ex-

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[1] In relation to this diversity of choices, the available data (U.S. Bureau of the Census) show that industries vary considerably in their degree of forward integration. Further, as John and Weitz (1988) point out, such diversity is likely to extend to firms within industries as well.

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amples of such intermediate options are the use of commission agents to serve foreign markets, joint ventures, and cooperative marketing arrangements.

Stern and El-Ansary (1988) stress that the channel integration decision is a critical component of any firm's marketing channel strategy. The decision is of even greater significance in an international context. Choosing the right level of channel integration can make the difference between success and failure in a foreign market, as it represents a point of vulnerability for the firm in terms of both market response and opportunity losses (cf. Keegan 1984; Root 1987). Moreover, the correct decision must be made early, because initial commitments may not be easy to terminate. The question that must be answered is what degree of forward integration firms should choose in foreign markets and why.

Most empirical research in the channels literature has centered on the management of ongoing dyadic channel relationships rather than on the structure of the channel. Fortunately, interest in channel integration issues has been rising among channels researchers in recent years, in part because of the development of transaction cost analysis by Williamson (1975, 1985; see Anderson and Weitz 1986). Important empirical studies on channel integration have been performed by Lilien (1979), Anderson (1985), Coughlan (1985), Dwyer and Welsh (1985), Anderson and Coughlan (1987), and John and Weitz (1988). Coughlan (1985) and Anderson and Coughlan (1987) fo-

cused on the nature of channel integration in foreign markets, and Anderson (1985) and John and Weitz (1988) developed and tested models based on transaction cost analysis. These studies represent an excellent start, but a variety of important research issues remain unresolved. For example, Reid (1983) has advocated the application of transaction cost analysis to questions of firm internationalization.

The purpose of our article is to expand understanding of the reasons underlying firms' channel integration decisions in international markets. For the first time, a model based on transaction cost analysis is developed and applied to explain levels of forward integration within distribution channels in foreign markets.[2] Production costs also are treated in the model. The data necessary to test the model were gathered from a group of Canadian export firms.

Our study is unique in two other respects. First, we examine four different integration choices (i.e., market exchange, intermediate exchange, and two forms of hierarchical exchange). With the exception of John and Weitz' (1988) work, the other empirical studies on channel integration have focused on only two choices, whether the channel is direct or indirect. Second, we divide "external uncertainty" into two dimensions (environmental volatility and diversity), each being argued to have a differential impact on the nature of channel integration in foreign markets. Previous research based on transaction cost analysis has treated external uncertainty as unidimensional. Prestudy interviews with approximately 10 Canadian exporters guided the development of the theoretical model and the operational measures.

After briefly examining the basic theoretical rationale for the impact of production costs and transaction costs on channel integration, we review in greater detail the empirical research on vertical integration in channels of distribution. We then develop the research hypotheses and describe the methods used to collect the data, develop the measures, and test the hypotheses. Finally, implications and limitations of the study are discussed.

PRODUCTION COSTS AND TRANSACTION COSTS

To what extent should a firm perform all marketing-distribution functions internally instead of relying heavily on outside intermediaries? The traditional answer in the marketing literature has been based on a production cost argument (cf. Rosenbloom 1987; Stern and El-Ansary 1988). The assumption has been that all firms desire more control, which leads to a preference for integration, but that such arrangements will not be feasible unless the

associated fixed costs can be spread over a large volume of business. Furthermore, as the volume of business increases, firms are able to specialize in the performance of marketing-distribution functions and reap the benefits of economies of scale. Though production costs appear important, especially in terms of "efficiency" as opposed to "control," they alone are insufficient to explain variations in channel integration. For example, a production cost explanation cannot account for the use of market exchanges by large firms or different degrees of integration by firms of smaller size and less experience.

Transaction cost analysis (Williamson 1975, 1985) offers another perspective to help us understand better the forces shaping channel structure. The basic premise of transaction cost analysis (TCA) is that the firm will internalize activities that it is able to perform at lower cost and will rely on the market for activities in which other providers have an advantage. TCA is built on a microanalytic framework with strong behavioral reality. Channel members are assumed to be subject to bounded rationality. Furthermore, at least some actors are assumed to be opportunistic (i.e., having a tendency to cheat other parties) if given the chance. Imperfect, or asymmetric, information may give such actors an exploitable advantage in their dealings with other parties.

Transaction costs (i.e., the costs of governing the system) tend to be low in highly competitive markets, thereby providing little or no incentive to substitute internal organization for market exchange. In contrast, when faced with an inability of markets to impose behavioral constraints and enforce simple contracts, firms are expected to internalize transactions to reduce costs of exchange. A limit on integration is the fact that organizations are not perfect and transaction costs also are present within them.

Though TCA tends to downplay the impact of production costs on forward integration, the objective is to minimize the sum of transaction and production costs in making forward integration decisions (see John and Weitz 1988 and Williamson 1985, p. 92–94, 129). The higher the costs of contracting externally, the greater is the incentive to internalize transactions.

Unlike production costs, transaction costs are very difficult to measure because they represent the potential consequences of alternative decisions. Researchers examining transaction cost issues almost never attempt to measure such costs directly, but rather test whether organizational relations align with the attributes of transactions as predicted by transaction cost reasoning (Williamson 1985). "The level of specialized assets required to support the exchange, the uncertainty surrounding the exchange, and the frequency of exchange are identified as the principal factors that make market-mediated exchange inefficient" (John and Weitz 1988, p. 121–122). Asset specificity is the extent to which specialized investments are needed to support an exchange, whereas uncertainty reflects the ability to predict relevant contingencies, both internal and external to the firm. "Fre-

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[2]Anderson and Coughlan (1987) examine a number of constructs suggested by several different perspectives and do not study uncertainty. Gatignon and Anderson (1988) examine the degree of control multinational corporations have over foreign subsidiaries and do not examine variations in channel integration choices *per se*.

quency" refers to the distinction between one-time and recurrent exchange.[3]

LITERATURE REVIEW

The predictions of transaction cost analysis in terms of asset specificity and internal uncertainty (i.e., performance evaluation) have been supported in studies by Anderson (1985) and John and Weitz (1988), and Anderson and Coughlan (1987) find support for the relationship between asset specificity and channel integration. Asset specificity and internal uncertainty have been shown to be related positively to the level of integration in the channel in these studies.

Results relating to the external uncertainty construct have been mixed. Only John and Weitz (1988) have found a significant, positive relationship between external uncertainty and the level of channel integration. Unpredictability (Anderson 1985) and heterogeneity (Dwyer and Welsh 1985) have been found to be unrelated to channel integration, though Anderson (1985) did find a significant interaction between asset specificity and external uncertainty.

Results have also been mixed on constructs relating to production costs. Several empirical findings of Lilien (1979) support an economies of scale interpretation. However, Anderson (1985) found no significant production cost effects, and John and Weitz (1988) found only one of two contructs reflecting production costs to be significant. Transaction cost constructs dominated production cost constructs in both of the latter studies.

A variety of other constructs have been found to be related to channel integration in previous empirical research. For example, in a study of channels in international markets, Anderson and Coughlan (1987) found that shared channels and country destination were important.

RESEARCH HYPOTHESES

Because theory suggests that firms act in such a way as to minimize the sum of transaction and production costs, both types of cost must be incorporated in any conceptualization. The model developed and tested here is based on choices between alternative channel structures for a specific product line in a specific foreign market as determined by constructs related to both types of costs.

Within this study, the differences between market exchange, intermediate exchange, and hierarchical exchange are based on the economic tradition of "functions performed" (Williamson 1975), rather than on the organizational theory tradition of the closeness of the relationship or level of coordination between firms in an exchange (cf. Ouchi 1980). Market exchange is reflected by the use of merchant distributors who take title to the

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[3]The frequency variable is not examined because we are interested only in recurrent exchange.

firm's products and perform most necessary functions within the foreign country. Intermediate exchange is reflected by the use of independent organizations that perform only the selling function (e.g., commission agents), other necessary functions being performed largely by the focal organization. Given the international focus of our study, two hierarchical modes are relevant—the establishment of a wholly owned foreign sales subsidiary or serving the foreign market directly from the home country of the firm. Though the firm performs a relatively large number of functions itself in either case, the mode of operation is different across the two. When the subsidiary option is used, the firm establishes a physical presence in the foreign country, with salespeople being housed and significant inventory being carried therein. Under the other hierarchical option, salespeople travel and products are shipped from the firm's home base directly to foreign customers.

Channel Volume

Production costs are the costs of actually performing marketing-distribution functions. If channel volume for a product line is relatively low in a foreign country, the firm is likely to prefer a market exchange whereby intermediaries can handle the product line more economically through assembling product lines from many firms. In contrast, when channel volume is high, the production cost advantage of the market mode can be reduced virtually to zero. As Williamson (1985, p. 94) states, "The firm is simply better able to realize economies of scale as its own requirements become larger in relation to the size of the market." Economies of scale are facilitated by the potential for internal specialization and division of labor, which lead to reduced production costs. More specifically, Anderson (1985) argues that high product volume facilitates economies of scale in finding, holding, and utilizing management skills, enabling the firm to get more benefit from its expenditures on a field salesforce and other marketing instruments.

H₁: The greater the channel volume for a product line in a foreign market, the greater is the degree of channel integration.

In terms of the two hierarchical options, the establishment of foreign subsidiaries is expected to be facilitated by relatively high levels of channel volume for the product line. Because increasing forward integration requires a more complex and specific governance structure, greater fixed costs are inevitable. To cover such fixed costs, greater volumes are required. If channel volume for the product line is not extremely high but economies of scale are still facilitated through use of an integrated channel, the firm is expected to serve the foreign market directly from its home base.

H₂: Within the hierarchical option, the use of foreign sales subsidiaries is associated positively with increasing levels of channel volume for the product line.

Asset Specificity

Competitive foreign markets for intermediary services limit the ability of independent channel members to behave opportunistically because intermediaries are replaceable. When markets fail, however, behavior may no longer be controllable at a low cost. A necessary condition for market failure occurs when an exchange requires one party to invest in assets, whether physical or intangible, that have no alternative usage outside that exchange. Such investment has the effect of reducing a large-numbers bargaining situation (i.e., one in which many intermediaries are available) to a small-numbers situation. As John and Weitz (1988, p. 124) state, "Because nonredeployable specific assets make it costly to switch to a new relationship, the market safeguard against opportunism is no longer effective." Under such conditions in foreign markets, firms are likely to use relatively integrated channels in which opportunism can be combatted through the exercise of legitimate authority, the monitoring of behavior, and the offering of more varied incentives than can be used with independent channel members. The positive effect of asset specificity on channel integration has received empirical support in studies by Anderson (1985), Anderson and Coughlan (1987), and John and Weitz (1988).

Small-numbers bargaining may well be the more common situation in channels decisions, particularly in an international context. The availability of alternative intermediaries who are able and willing to handle a manufacturer's goods may be severely restricted, especially at the outset (Keegan 1984).

> H₃: The greater the transaction specificity of assets, the greater is the degree of channel integration in a foreign market.

Asset specificity is not expected to affect the firm's choice of which hierarchical option to use.

External Uncertainty

To date, the external uncertainty construct in transaction cost analysis has been treated as unidimensional and viewed as another feature of market failure. High external uncertainty, given bounded rationality, precludes the writing and enforcement of contingent claims contracts that specify every eventuality and consequent response (Anderson and Weitz 1986). It allows negative information asymmetries to develop and provides the potential for outside intermediaries to behave opportunistically. As Williamson (1975, p. 23) states, "When, however, transactions are conducted under conditions of uncertainty/complexity, in which event it is very costly, perhaps impossible to describe the complete decision tree, the bounded rationality constraint is binding and an assessment of alternative organizational modes, in efficiency respects, becomes necessary." Internalization is seen to allow the absorption of external uncertainty through specialization of decision making and savings in

communication expenses, facilitating an adaptive, sequential decision process, which is argued to have optimal properties under such conditions. Furthermore, high integration economizes on transactions by harmonizing interests and permitting a wider variety of sensitive incentive and control processes to be activated.[4]

This view is in contrast to the theoretical position held by certain organization theorists, who have argued that looser structures (i.e., less vertically integrated) are more effective under conditions of high external uncertainty (cf. Lawrence and Lorsch 1967; Pfeffer and Salancik 1978). A flexible organization is seen to be better able to adapt to changing circumstances. Highly integrated organizations are seen to be somewhat insulated from the environment and hence slow to react. The firm choosing an integrated governance structure in an uncertain environment may find it difficult to manage and then relatively difficult to dissolve.

What each perspective ignores is the possibility that external uncertainty has multiple dimensions, each with a differential impact on organization structure and channel choice. External uncertainty appears to be too broad a concept to be treated unidimensionally; different facets of external uncertainty may lead to either a motivation to reduce transaction costs (the economic tradition) or a desire for flexibility (the organization theory tradition). Support for opposing uncertainty effects on integration matters is provided by Walker and Weber (1984) and Balakrishnan and Wernerfelt (1986). Walker and Weber found that volume uncertainty had a significant, positive effect on making a component part in-house, whereas technological uncertainty was related positively (though not significantly) to buying the component part from the market. Balakrishnan and Wernerfelt show that though uncertainty in general makes integration more effective, one particular uncertainty—the possibility of technological obsolescence—works the other way. Splitting the external uncertainty construct into its components allows such opposing effects to be investigated.

Two dimensions of external uncertainty are of interest in our study—the volatility and the diversity of the environment in the foreign market. These two dimensions correspond to the environmental volatility and diversity dimensions examined by Leblebici and Salancik (1981), who found them to have differential effects on decision

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[4]In the full theoretical statement presented by Williamson (1975), both transaction-specific assets and uncertainty are deemed necessary for market failure. Either effect without the other should not result in market failure (Anderson 1985). However, this rationale may not hold in foreign markets. External uncertainty in any foreign market should be such that an increase in asset specificity would increase transaction costs. In addition, if external uncertainty is extremely high, it should influence transaction costs independently of the level of asset specificity. This reasoning aside, the interactions of asset specificity and environmental volatility and diversity are examined in the data analyses.

processes. They are also similar to the dimensions of complexity and dynamism developed by Duncan (1972) and supported by Dess and Beard (1984).

Volatility refers to the extent to which the environment changes rapidly and allows a firm to be caught by surprise (cf. Leblebici and Salancik 1981). High volatility in a foreign market is expected to lead to an inability to predict future outcomes, which creates problems in writing contracts because these agreements will be incomplete in some important respects. When unforeseen contingencies arise, market contracts are strained in adapting to the changed circumstances because opportunistically inclined parties can try to interpret unspecified clauses to their own advantage. As John and Weitz (1988) and Stinchcombe (1985) indicate, institutional structures that permit sequential, adaptive decision making are needed when such uncertainty increases. Therefore, high external uncertainty based on high levels of volatility should lead to relatively high transaction costs in market exchanges in foreign markets, encouraging high levels of channel integration in order to reduce such costs.

Diversity reflects the extent to which there are multiple sources of uncertainty in the environment (i.e., highly heterogeneous) (cf. Aldrich 1979). A foreign market with high diversity would contain many customers, many final users, and many competitors for the firm's product, with high dissimilarity among them. A firm facing a highly diverse environment in a foreign market would have difficulty in obtaining and processing information about environmental entities. Moreover, because a firm must adopt multiple strategies to address the multiplicity of demands and constraints in a diverse or heterogeneous foreign environment (cf. Keegan 1984), formulating effective strategic programs and responses is also very difficult. In combination, the greater amount of information needed and the greater difficulties associated with developing multiple strategies suggest that environmental diversity in a foreign market will encourage the development of complex and fluid channel structures that enhance the channel's ability to cope with specialized demands (cf. Achrol, Reve, and Stern 1983; Dwyer and Welsh 1985). Independent channel members within the foreign market will be better able to cope with such heterogeneity (Keegan 1984). Therefore, external uncertainty caused by the diversity of the environment is expected to lead to a desire for flexibility in channel structure (i.e., less integration). High diversity does not, in itself, suggest that high volatility also is present in the foreign market.[5]

The preceding discussion suggests that the external uncertainty effect can be broken down into the following two hypotheses:

H₄: The greater the volatility of the environment sur-

rounding a transaction in a foreign market, the greater is the degree of channel integration.

H₅: The greater the diversity of the environment surrounding a transaction in a foreign market, the lesser is the degree of channel integration.

In terms of the hierarchical option, a highly volatile environment is likely to make a foreign market difficult to serve from the firm's home base. The establishment of a foreign subsidiary places the firm closer to the marketplace where it is in a better position to react and adapt to unforeseen circumstances. The diversity of the environment is not expected to influence the choice between these two forms of hierarchy.

H₆: Within the hierarchical option, the use of foreign sales subsidiaries is associated positively with the level of environmental volatility.

METHODS

Data Collection

The unit of analysis for studying levels of channel integration must be the transaction, as suggested by Williamson (1975, 1985). For purposes of our study, the transaction is the exporting of a particular product to a particular foreign market by a particular firm.

The data necessary to test the research hypotheses were gathered from a group of Canadian export firms, identified through use of an industry directory. All firms listed, with the exception of those dealing solely in unprocessed primary products, were surveyed (925 firms) through use of a mail questionnaire.[6] Key informants were identified by name from the directory and were usually either the owner or the general manager of the firm. A total of 510 firms responded, a 55% response rate. Data were available on each of the study constructs in 375 cases, as 33 questionnaires were unusable because the respondents did not follow instructions at the beginning and 102 informants failed to provide data necessary to measure all independent variables; missing data were especially common on the items relating to channel volume. All questionnaires with data on necessary items, however, were used for measure assessment purposes. A general description of the sample is presented in Table 1.[7]

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[5]The presence of environmental volatility may create a need for flexibility as well. However, transaction cost pressures are likely to dominate any such effect.

[6]Prestudy interviews indicated that many unprocessed primary products sold by Canadian export firms are commodities. As such, these products are not likely to provide much variation on asset specificity. Moreover, it appeared difficult to devise an instrument that would be appropriate for both manufactured and unprocessed primary products. Unprocessed products therefore were excluded.

[7]In examining possible nonresponse bias, we compared late respondents with early respondents on several characteristics. Late respondents tended to be smaller firms ($p < .10$), but were similar to early respondents on all other characteristics. Moreover, the proportion of respondent firms identifying the United States as the major export market (i.e., 63%) is similar to the proportion of Canadian exports that go to the United States (approximately 70%). These findings and the study's high response rate suggest that nonresponse bias is not a serious problem.

Table 1
SAMPLE DESCRIPTION

	%
Industry classification	
Agriculture and primary products	1
Consumer products	18
Paper and printing	4
Metal machinery and equipment	41
Electric and electronic	16
Minerals and chemicals	20
Export experience	
Less than 5 years	21
5 to 15 years	36
More than 15 years	43
Firm size (annual sales)	
Less than $1 million	10
$1 million to $5 million	26
$5 million to $10 million	17
$10 million to $100 million	35
More than $100 million	12
Export intensity (export as percentage of total sales)	
Less than 20%	48
20% to 50%	23
Over 50%	29
Owner managed	58

Operational Measures

Prestudy interviews with approximately 10 Canadian exporters were instrumental in devising the operational measures for the study. They were especially useful in identifying the relevant channel integration options in international markets and developing the measures of environmental volatility and diversity.

Channel integration. Respondents were informed that the focus of the study was the marketing channels used by Canadian exporters to serve foreign markets and were told to concentrate on their firm's most important export product in its most important foreign market. After writing down the product and market (i.e., country), each respondent was asked to indicate which of the following descriptions best matched the firm's export arrangements for that product in that market: (1) "We have a wholly owned sales subsidiary" (62 firms), (2) "We serve the market directly from Canada, using company personnel" (121 firms), (3) "We are involved in a joint venture with another company to handle sales of this product in this market" (13 firms), (4) "We use commission agents" (74 firms), (5) "We sell to a merchant distributor who takes title to our product and contacts buyers himself" (76 firms), and (6) "Other [please specify]." The descriptions provided corresponded to two hierarchical modes (the establishment of a foreign sales subsidiary or serving the foreign market from home), an intermediate mode (the use of commission agents or joint ventures), and a market mode (the use of merchant distributors).

By checking more than one description or checking the "other" category, 29 firms indicated use of "dual" channels. These firms are held out of the hypothesis tests,

but are compared subsequently with firms using the market mode.

Channel volume. Respondents were asked: (1) "Of your total export sales last year, what percentage is made up by this particular product to this particular market?", (2) "What percentage of your total sales last year came from exports?", and (3) "Approximately, what was the total value of your firm's sales last year?" The "channel volume measure" was derived from a combination of these items, which resulted in a dollar value for a firm's annual exports of the particular product to the particular market (measured in $10,000s).

Asset specificity. Asset specificity refers to the degree to which durable, transaction-specific assets were found in the export channel. Both physical and human assets were assessed. The six items used to measure this construct are listed in Table 2. These items were adapted, in part, from those used by Anderson (1985) and have strong face validity. The items were measured on 7-point scales ranging from 1, "completely disagree," to 7, "completely agree." They were summed and averaged to arrive at the measure of asset specificity ($\alpha = .65$).

External uncertainty. Separate measures for the two types of uncertainty were developed. "Volatility" refers to the extent to which the environment changes rapidly and allows a firm to be caught by surprise and "diversity" refers to the extent to which there are multiple sources of uncertainty in the environment. The items developed to reflect these constructs are listed in Table 2. Seven-point scales ranging from 1, "completely disagree," to 7, "completely agree," were used. The items were summed and averaged to obtain a measure of each construct. Coefficient alpha is .70 for the volatility measure and .55 for the diversity measure.[8]

Assessment of Multiple-Item Measures

Factor analysis was used to assess the psychometric properties of the three constructs representing asset specificity, volatility, and diversity. Initial, separate analyses indicated that five items (not presented here) should be dropped from further analysis. These items, though appearing to reflect the constructs on the basis of content validity, did not contribute to the reliability of the scales.

To assess validity, Gerbing and Anderson (1988) argue for the use of all possible scales within a single analysis so that an assessment of internal consistency can be made. The results of such a factor analysis indicated that a three-factor solution best represented the data on the basis of a scree plot, as well as factorial complexity and interpretability. The factor loadings after a varimax rotation are reported in Table 2. With one exception, all

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[8] An argument could be made that the diversity measure represents an index rather than a scale. In a theoretical sense, simply because there are many customers does not necessarily mean that there are also many competitors. As Howell (1987) indicates, coefficient alpha is appropriate only for measurement scales, not indexes.

Table 2
PSYCHOMETRIC PROPERTIES OF MEASURES

	Factor 1	Factor 2	Factor 3
A. Asset specificity			
1. It is difficult for an outsider to learn our ways of doing things.	−.21	.01	.53
2. To be effective, a salesperson has to take a lot of time to get to know the customers.	−.05	.13	.58
3. It takes a long time for a salesperson to learn about this product thoroughly.	.18	−.01	.69
4. A salesperson's inside information on our procedures would be very helpful to our competitors.	.14	.04	.60
5. Specialized facilities are needed to market this product.	.03	−.01	.67
6. A large investment in equipment and facilities is needed to market this product.	.32	−.01	.52
Eigenvalue			2.30
% variance explained			19.20
B. Volatility			
1. We are often surprised by the actions of retailers and wholesalers.	.08	.77	−.00
2. We are often surprised by the actions of our competitors.	.07	.81	.09
3. We are often surprised by customer reaction.	−.07	.78	.02
Eigenvalue		1.87	
% variance explained		15.60	
C. Diversity			
1. There are many final users of this product in this market.	.78	.04	−.06
2. There are many competitors for this product in this market.	.62	.18	.07
3. We have only a few immediate customers for this product in this market (reverse scaled).	.64	−.13	−.07
Eigenvalue	1.56		
% variance explained	13.00		

variables have a loading of less than .25 on inappropriate factors, whereas all hypothesized loadings are greater than .5. Even with an oblique rotation, little change occurred in the factor loadings and factor correlations were minimal (.09, .04, −.005).

A confirmatory factor analysis also was conducted on these items. The resulting χ^2 was 142, significant at beyond .001. However, the goodness-of-fit index was .94, all individual t-tests for factor loadings were significant, and only two of 55 normalized residuals were above .2. The discriminant validity of the measures appears to be established on the basis of the results of the common and the confirmatory factor analyses.

Control Variables

Two control variables were included in the estimation model. One was whether or not the firm also sells other products through the channel in question. The channel volume variable reflects only the volume of the export firm's most important product in the foreign market. If other products went through the same channel, the ability of the firm to reap economies of scale would increase; production costs would be reduced (cf. Anderson and Coughlan 1987). A dummy variable was created to equal one if the channel was shared and zero otherwise. In 50% of the cases, the channel was in fact shared. On the basis of prestudy interviews, we expected that export firms would tend to use integrated channels when multiple product lines were distributed through the same channel in foreign markets.

The second control variable was specific to the Canadian context and represented whether or not the market in question was the United States. A majority of Canadian exports go to the United States and prestudy interviews indicated that Canadian export firms have significantly different perceptions of the U.S. in comparison with other foreign markets. Many Canadian exporters regard the U.S. as an extension of the domestic market. Hence, we believed that, *ceteris paribus*, the degree of integration was likely to be greater in the U.S. market than elsewhere. A dummy variable was created to equal one if the U.S. market was involved (65% of the cases) and zero otherwise.[9]

Estimation Results

Hypotheses about the factors encouraging or discouraging forward integration were tested by using a multinomial logit model (Malhotra 1984) that estimated the impact of the independent variables on the probability that each channel mode would be selected. This analytical model is appropriate because the determinants of the utility of one mode could differ from those of other modes. Estimation entailed the use of LIMDEP and the Newton-Raphson method of maximizing the log-likelihood function (see Bunch and Batsell 1989).

When the multinomial logit model is estimated, one option must be used as the base mode because once j − 1 alternative probabilities are known, the jth is determined. In testing H_1, H_3, H_4, and H_5, the base mode used was that which theoretically represents the default option, namely the market option (i.e., use of distributors). The utility of the market option was assigned a value of zero and the utilities of the other options were estimated and interpretable with reference to it. The size of the various coefficients indicates the extent to which the corresponding variables contribute to the utility of choosing that option beyond their contribution to the utility of the market option. Results are reported in Table 3. The chi square statistic tests the hypothesis that the estimated coefficients, except the constant, are all zero. As

[9]The correlations among the independent variables, including the control variables, range from −.08 to .22, indicating no problems of multicollinearity.

Table 3
ESTIMATION RESULTS[a]

Option	Constant	Dummy: U.S.	Dummy: shared	Channel volume	Asset specificity	Diversity	Volatility
A. Comparison with market option							
Market	0	0	0	0	0	0	0
Intermediate	-.75	.71**	.28	3.1*	.15	-.10	.03
	(-.83)	(2.11)	(.85)	(1.35)	(1.12)	(-.89)	(.29)
Hierarchy–domestic	-.78	1.38***	.47*	5.5***	.32***	-.32***	.02
	(-.87)	(4.05)	(1.50)	(2.51)	(2.34)	(-2.98)	(.20)
Hierarchy–subsidiary	-3.91***	1.18***	1.16***	6.7***	.24*	-.01	.25**
	(-3.42)	(2.87)	(3.01)	(3.05)	(1.46)	(-.04)	(1.91)

Log likelihood = -426.95
χ^2 = 84.2
Significance = .0000001
Correct classification rate = 43%
Correct by chance = 30%
Tau = .19
N = 346

Option	Constant	Dummy: U.S.	Dummy: shared	Channel volume	Asset specificity	Diversity	Volatility
B. Comparison with intermediate option							
Intermediate	0	0	0	0	0	0	0
Hierarchy–domestic	-.08	.69**	.21	2.4**	.16	-.21**	-.00
	(-.10)	(2.12)	(.74)	(1.90)	(1.27)	(-2.26)	-(.04)
Hierarchy–subsidiary	-3.11***	.52*	.86***	3.6***	.09	.09	.21**
	(-2.85)	(1.30)	(2.37)	(2.83)	(.60)	(.68)	(1.68)

Log likelihood = -264.4
χ^2 = 45.0
Significance = .0001
Correct classification rate = 52%
Correct by chance = 39%
Tau = .21
N = 270

Option	Constant	Dummy: U.S.	Dummy: shared	Channel volume	Asset specificity	Diversity	Volatility
C. Hierarchy (domestic) compared with hierarchy (subsidiary)							
Hierarchy–domestic	0	0	0	0	0	0	0
Hierarchy–subsidiary	-2.88***	-.07	.65**	1.2**	-.08	.29***	.18*
	(-2.82)	(-.19)	(1.89)	(2.28)	(-.60)	(2.40)	(1.45)

Log likelihood = -105.4
χ^2 = 23.4
Significance = .006
Correct classificaton rate = 72%
Correct by chance = 61%
Tau = .29
N = 183

Option	Constant	Dummy: U.S.	Dummy: shared	Channel volume	Asset specificity	Diversity	Volatility
D. Dual channel compared with market							
Market	0	0	0	0	0	0	0
Dual channel	-3.25***	1.56***	.08	3.8*	.02	.03	.02
	(-2.40)	(2.80)	(.19)	(1.39)	(.52)	(.47)	(.41)

Log likelihood = -55.7
χ^2 = 12.3
Significance = .056
Correct classificaton rate = 72%
Correct by chance = 71%
Tau = .06
N = 105

[a]Numbers in parentheses are t-statistics.
*p < .10, one-sided test.
**p < .05, one-sided test.
***p < .01, one-sided test.

is evident from Table 3, this hypothesis is rejected at beyond the .01 level.

The coefficients of channel volume are positive and significant in each case, and especially high for the hierarchical options. These findings indicate that as volume of the product line increases, the probability of using a highly integrated channel increases in relation to the probability of using the market option. H_1 is supported by the results.

H_3 predicts that asset specificity is related positively to the level of channel integration. The coefficients relating to asset specificity in Table 3 support this prediction, as they are positive and significant on each hierarchical option.

Mixed support is found for H_4 and H_5 on the relationships between volatility, diversity, and channel integration. As volatility increases, the probability of using the hierarchy-subsidiary option increases in relation to the probability of using the market option, as expected. However, the volatility coefficient is insignificant on the other hierarchy option. As predicted, diversity is related inversely to the use of the hierarchy-domestic option, but it is unrelated to the hierarchy-subsidiary option. At least some support for opposing external uncertainty effects is offered by these results.

The two control variables are related significantly to channel integration as anticipated. The use of shared channels and distribution to the U.S. market are both related positively to the level of channel integration.

To ascertain whether the model in part A of Table 3 fits the data well, we used it to classify the observations. A total of 43% of the observations are classified correctly. The tau statistic is .19, indicating that the 43% classification rate represents 19% fewer classification errors than would be expected by chance. However, this finding must be interpreted with caution, as the data that were classified were also used to estimate the model. Much of the classificatory power of the model comes from channel volume and the control variables. Overall, the fit of the model is weak, suggesting that measurement problems are present and/or other constructs with an important impact on channel integration were excluded from the model. Clearly, attempting to classify correctly across four different options is difficult.

For a more complete view of the tradeoffs among the integration options, results of a comparison of the two hierarchical options with the intermediate option as the base mode are reported in Table 3, part B; exporters using the market option were withheld from this analysis. The chi square statistic is significant beyond the .01 level, with the classificatory power of the model improving slightly as reflected by the tau statistic. The coefficients in part B are similar to those in part A, with the exception that neither of the coefficients for asset specificity is significant in differentiating intermediate exchanges from hierarchical exchanges. This finding suggests that asset specificity may serve only to differentiate exchanges at either extreme. Again, environmental volatility is related positively and significantly to use of the

hierarchy-subsidiary option, whereas environmental diversity is related inversely and significantly to use of the hierarchy-domestic option.

In testing H_2 and H_6, the base mode used is the hierarchy-domestic option, which is compared with the hierarchy-subsidiary option. Results are reported in Table 3, part C. The chi square statistic is again significant beyond the .01 level and the tau statistic is larger than in the preceding two tests. As is evident, the probability of utilizing a foreign subsidiary increases as channel volume and volatility each increase, providing support for H_2 and H_6. Use of a shared channel also facilitates the foreign subsidiary option. Unexpectedly, environmental diversity has a significant positive relationship to that option. One interpretation is that if other factors indicate the necessity of a hierarchical exchange, the firm prefers to be located within a foreign market when faced with high diversity.

Interestingly, the constant term for the hierarchy-subsidiary option is negative and significant in each part of Table 3, indicating that this option is always least preferred among the channel options. This finding is consistent with what transaction cost analysis would predict. However, it must be interpreted with caution, as it is based on the assumption of a correctly specified model. If other important constructs were included in the model, the size, sign, and significance of the constant could change.

On the basis of arguments and results of Anderson (1985), the interaction of asset specificity and the two external uncertainty dimensions also was examined in separate analyses (not reported here). The interaction terms were included first without the main effects of asset specificity, diversity, and volatility, and then with those main effects. Each solution was clearly inferior to those in part A of Table 3, especially the second solution. Multicollinearity was a problem in each case, leading to unstable coefficients.

Finally, the results of the comparison between the dual channel and market options are reported in Table 3, part D. Only country destination and channel volume are significant. The probability of using dual channels increased when the U.S. was the export country and the channel volume of the product line was high. However, the classificatory power of the model is extremely weak, as only two of the 29 dual channel cases are classified correctly.

DISCUSSION

Our study is the first in which a model based on transaction cost analysis has been applied to explain levels of forward integration within distribution channels in international markets. The results provide support for some of the fundamental predictions of transaction cost analysis.

Asset specificity is shown to differentiate significantly between the use of market exchanges and hierarchical exchanges. When specialized knowledge and invest-

ments are necessary to facilitate transactions in foreign countries, the ability of the market to curb the opportunistic tendencies of outside intermediaries is limited. Under such conditions, hierarchical exchanges are likely to be preferred because opportunism can be combatted within the firm through the exercise of legitimate authority, the monitoring of behavior, and the offering of more varied incentives. Our findings related to asset specificity are consistent with those of Anderson (1985), Anderson and Coughlan (1987), and John and Weitz (1988), as well as with those from a variety of other studies that have focused on this construct (see Joskow 1988 for a review).

Interestingly, asset specificity does not distinguish the use of intermediate exchanges from the use of either market exchanges or hierarchical exchanges, suggesting that the need for specialized knowledge and investments affects channel choice only at either extreme. When only one or a few functions are entrusted to outside intermediaries in foreign markets, the firm may believe it can maintain control of the channel and associated transaction costs irrespective of the level of asset specificity.

The external uncertainty prediction of TCA is supported by the positive relationships between environmental volatility and the probability that a foreign sales subsidiary would be established by the firm (see Table 3, A and B). An adaptive, sequential decision process is needed to cope with rapid environmental change and is most likely to be implemented in a highly integrated channel (John and Weitz 1988; Stinchcombe 1985). Transaction costs will be reduced as a result. However, given that environmental volatility is unrelated to the hierarchical option of serving the foreign market directly from home, empirical support for this effect is mixed. Results relating to external uncertainty and channel integration also have been mixed in previous research.

The results related to asset specificity and environmental volatility suggest that the ability of the market to enforce desired or contracted behavior cannot be taken at face value in noncompetitive international markets. Rather, the degree of market failure present in particular foreign markets for particular product lines must be recognized and taken into account.

Strong support is found for the impact of production costs on channel choice. As channel volume for the firm's product line in the foreign market increased, the integration of the channel increased as well. High product volume is likely to afford economies of scale in acquiring necessary resources and developing management skills, thereby lowering production costs. Beyond the individual transaction, a production cost effect also is suggested by the findings associated with the use of shared channels. The firm is more likely to use an integrated channel when it can distribute multiple product lines through the channel because of economies of scale. The channel volume and shared channel constructs have stronger relationships with the level of channel integration in our study than do asset specificity and environmental volatility.

In previous research on channel integration, the impact of production costs has been mixed. Anderson (1985) found no support for production cost effects, whereas John and Weitz (1988) found a weak production cost effect that was dominated by transaction cost effects. Only Lilien's (1979) results strongly support the importance of production costs. Our results clearly suggest that the ideal channel arrangement should reflect both the volume of goods involved and the vulnerability of the firm to opportunistic behavior by outside intermediaries. In other words, both the costs of actually performing distribution functions and the costs involved in governing the channel should be considered.

In addition to finding support for the impact of transaction costs and production costs on channel integration, we attempted to extend the transaction cost analysis perspective in terms of its treatment of external uncertainty. The two dimensions of external uncertainty examined have different effects on channel integration. Environmental volatility is related positively to the hierarchy-subsidiary option, and environmental diversity is related inversely to use of the hierarchy-domestic option. When faced with a highly diverse environment in a foreign market, the firm may be motivated to maintain a flexible organization and rely on local intermediaries to cope with the market's complexity. These results suggest that an unbundling of the external uncertainty construct is essential to an understanding of the often opposing desires for flexibility and efficiency. Such a conclusion cannot be drawn with certainty, however, because neither environmental dimension is related significantly to both hierarchical options. It is encouraging to note that empirical results of both Balakrishnan and Wernerfelt (1986) and Walker and Weber (1984) support the need to examine different dimensions of uncertainty separately when applying TCA.

The international context of our study enabled us to compare two different hierarchical options. Production cost factors are found to be most important in differentiating the use of either option. As channel volume increases and when shared channels are present, the probability of having a wholly owned foreign subsidiary is found to increase. To offset the fixed costs of establishing and maintaining a foreign subsidiary, greater sales volumes are necessary. Furthermore, both environmental volatility and diversity are related significantly and positively to the subsidiary option (in comparison with the hierarchy-domestic option). The volatility effect is expected, as the establishment of a subsidiary places the firm in a better position to react and adapt to unforeseen circumstances in the foreign market. However, the diversity effect is unexpected. When other factors indicate the use of a highly integrated channel, the firm may prefer to establish a local presence in a foreign market when faced with high external uncertainty, whether it comes from rapid change or from the presence of a heterogeneous group of customers and competitors or both.

The preceding results shed light on the nature of channel integration in international markets. However, the

study raises more questions than it answers. Though evidence of opposing external uncertainty effects is found, the results are somewhat weak. Future research must examine in greater detail how environmental volatility and diversity, as well as other dimensions of external uncertainty (e.g., volume uncertainty, technological uncertainty), relate to alternative levels of channel integration in both domestic and foreign markets.

Similar to results of Walker and Weber (1984) is our finding that production cost factors have a stronger impact than transaction cost factors. However, Anderson (1985) and John and Weitz (1988) found transaction cost factors to dominate. Additional research is needed to examine further the relative importance of production cost factors and transaction cost factors in affecting channel integration. Contingency theories perhaps should be developed.

Ours is the first empirical study on channel integration to examine intermediate exchanges. Though the ability of the model to differentiate these exchanges from hierarchical exchanges is reasonable, intermediate exchanges are weakly distinguished from market exchanges. Future research must further study intermediate exchanges and build better models to distinguish them from other forms of exchange. Moreover, we identified intermediate exchanges on the basis of channel members' performance of the selling function. It would be interesting to examine intermediate exchanges in which other functions are involved. Differentiating market exchanges from intermediate exchanges on the basis of the organization theory tradition of the "closeness of the relationship" also warrants attention (cf. Dwyer, Schurr, and Oh 1987).

Country destination, whether the U.S. or elsewhere, has a consistently strong and positive effect on the level of integration in the channel. This finding could be due primarily to the study context, as the establishment of integrated channels in the U.S. market by Canadian exporters is facilitated by both geographical proximity and cultural similarity. Future research must evaluate whether or not this is an isolated effect. Empirical results of Anderson and Coughlan (1987) suggest otherwise.

Finally, our model does a very poor job of explaining the use of dual channels, though part of the problem may be the small number of dual cases examined. Previously, only John and Weitz (1988) had examined empirically the use of dual-multiple channels. The question of when the use of dual-multiple channels is appropriate is extremely important managerially and warrants greater attention in the future.

LIMITATIONS

The transaction cost analysis model and the control variables are weak in classifying the export firms in terms of their channel choices. Imperfect measurement accounts for part of this lack of fit, especially given the developmental stage of this research area and the fact that our study pertains to an aspect of international mar-

keting (cf. Graham and Grønhaug 1989). The measures of environmental volatility and environmental diversity especially appear to need improvement. Other approaches to measuring channel volume also are needed, as data were missing on many of the sales items used in our study.

Further, the transaction cost analysis model was estimated on the basis of current practices of the export firms, whereas the theoretical foundation of TCA is essentially normative. In basing the hypothesis tests on current practices, we assume that inefficient practices have been selected out and that some type of equilibrium has been reached. Such an assumption may not be strictly true in the case of all export firms, as government restrictions, contractual commitments, resource scarcity, lack of capable intermediaries, and other factors can lead to a significant positive-normative gap. To the extent that there are differences between what firms desire in their channel arrangements and what they are able to achieve, the fit of the TCA model would be lessened.

Another possible explanation for the low classificatory power of the model is that the transaction cost analysis model we tested is incomplete. Several researchers have commented on the limited scope of TCA (cf. Harrigan 1983; Heide and John 1988). The literature on foreign market entry suggests that factors related to political and economic risks influence channel integration (Cavusgil 1980; Keegan 1984; Root 1987). Other explanations for vertical integration have been proposed, including the product characteristic (Aspinwall 1958), market characteristic (Bucklin 1966), resource dependence (Pfeffer and Salancik 1978), political economy (Dwyer and Welsh 1985; Stern and Reve 1980), strategic purposes (Harrigan 1983; Porter 1985), and entry-deterring (Stigler 1951) frameworks. Several of these frameworks are non-efficiency-based.

Future research must address these limitations. An integration of alternative perspectives on forward integration would be especially welcome. The importance of such an integration is suggested by our study, in which organization theory is used to explain the environmental diversity effect on channel integration.

CONCLUSION

We developed and applied a model based on transaction cost analysis, including production cost indicators, to explain levels of forward integration within distribution channels in foreign markets. Four different integration choices—market exchange, intermediate exchange, and two forms of hierarchical exchange—were examined. Based on data collected from a group of Canadian export firms, the results provide support for the transaction cost model.

The most original findings of the study relate to two dimensions of external uncertainty. Environmental volatility and environmental diversity are shown to have differential effects on the level of integration in distribution channels in foreign markets, suggesting that the

TCA model must deepen its treatment of the external uncertainty construct.

Though most empirical research in the channels literature has centered on the management of ongoing dyadic channel relationships, a recent stream of research has focused on the nature of the firm's channel integration choices. In our study this focus is shifted to an international context, which we hope will stimulate additional research on channel integration in the future.

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