A METHODOLOGY FOR SPECIFICATION AND AGGREGATION IN PRODUCT CONCEPT TESTING

by

David A. GAUTSCHI *
Vithala R. RAO **

N° 86 / 24

* David A. Gautschi, INSEAD, Fontainebleau (France)

** Vithala R. RAO, Cornell University, Ithaca, New York (U.S.A.)

Director of Publication :

Charles WYPLOSZ, Associate Dean
for Research and Development

Printed by INSEAD, Fontainebleau
France

A METHODOLOGY FOR SPECIFICATION AND AGGREGATION IN PRODUCT CONCEPT TESTING

by

David A. Gautschi
INSEAD, France

and

Vithala R. Rao
Cornell University, Ithaca, New York

Working Paper

July 1986

ABSTRACT

While consumer researchers have employed various methods for eliciting individuals' preferences toward new product concepts, it is not clear that the methods permit easy generalization to consumer behavior. In this paper we propose a methodology to deal with the common problem of limited information in conjoint analysis methods used to measure preferences. We also present a pre-estimation stage aggregation method based on the notion of the representative consumer. We identify appropriate methods of preference measurement, aggregation, and specification of utility functions of multi-attributed choice alternatives and describe two empirical studies to illustrate the methods.

ABOUT THE AUTHORS

The authors are, respectively, Associate Professor of Marketing, European Institute of Business Administration (INSEAD), Fontainebleau, F-77305, France, and Professor of Marketing and Quantitative Methods, Johnson Graduate School of Management, Cornell University, Ithaca, New York 14853, U.S.A. The authors are grateful for a grant from the INSEAD Research and Development Committee for support of the data collection. Thanks are also due to Eric Wruck, a doctoral student in marketing at Cornell University, for his assistance in analysis. The authors are also grateful to the constructive criticisms of Daniel McFadden on an earlier version of this paper which was presented at the Telecommunications Demand Modeling Conference, sponsored by Bell Communications Research, Inc., New Orleans, November 1985.

INTRODUCTION

A common activity of marketing researchers involves the difficult task of studying consumers' preferences for a product concept or product modification before market introduction. A crude estimate of the demand for the concept is derived from individuals' preferences under one or more scenarios of competitive behavior and assumed rules for consumer choice. Typically, marketing researchers engage in this activity as part of a firm's new product development program where it is important to guide research and development toward potential market opportunities that promise a reasonable chance of commercial success.

In economics, Lancaster's reformulation of consumer theory [Lancaster (1971)], wherein objective product characteristics rather than commodity quantities are taken as arguments of the utility function, permits the estimation of the demand for new combinations of a set of characteristics describing existing alternatives in the market. The Lancasterian approach to demand estimation for new products is based on the revealed preferences of consumers. As transactions data are not available in product concept testing, conjoint analysis is applied to measure directly consumers' preferences for alternative combinations of characteristics [Green and Wind (1975)].

In spite of the increasing rigor of these analyses applied to the measurement of product concept preferences, there is no escaping the fact that the exercise in which the respondent in such studies participates is basically hypothetical. Indeed, there is a strong possibility that serious measurement error in the hypothetical setting would prevent accurate generalization to a market setting. Hence, in designing the experiment, the burden upon the researcher is to strike a balance between replicating a real environment and presenting the respondent with a manageable task.

With respect to the design of realistic experiments, two issues must be addressed. First, before a product is presented to the market it is often difficult for the marketing researcher to know precisely how a representative buyer defines the set of alternatives from which he intends to choose. In fact, consumers often use "evoked sets" of a limited number of alternatives in a well-defined product category and will not choose among all possible close substitutes [cf. Silk and Urban (1978)]. Moreover, the composition of a consumer's evoked set from one product category could influence his preference ordering on alternatives in his evoked set from another product category. This possibility is rarely acknowledged in product concept studies.

In many circumstances, the second issue regarding the design of the task follows from the first issue. If one represents choice alternatives as bundles of characteristics or attributes, then unavoidably the researcher must omit some attributes of alternatives in the experimental setting, if only to make the task for the respondent possible. Under the low information conditions of a conjoint analysis exercise price could be included in the preference function to proxy for unobservable qualities c alternatives. However, one must recognize that price also performs its conventional function as an allocative mechanism, given the individual's limited resources. Hence, the two influences of price--as a proxy and as an allocative tool--are likely to be confounded in such laboratory measurements of preferences. In a real market setting, the influence of price as a signal for hidden qualities of a product is likely to be significantly diminished, if not eliminated entirely, because information in a market setting is likely to be more complete than in a laboratory setting.

As it is generally important to determine the influence of price on demand (in the market), the two ways that price may influence preferences in the experimental setting must be distinguished from each other. We propose a simple, multi-stage procedure to accomplish this. The procedure requires the collection of two preference orderings from the individual respondent, namely, an ordering in the presence of a budget constraint and another ordering in the absence of any constraint.

The structure of the paper is as follows. In the next section we specify the model of a representative individual's preferences and choices and address two potential specification problems. In the third section we discuss the procedures to identify representative individuals prior to the estimation of their utility functions. The estimation procedures suggested ensure separation of the informational and allocative effects of price in the utility function. Two empirical illustrations are presented next, and managerial implications are discussed in the last section of the paper.

SPECIFICATION OF THE REPRESENTATIVE CONSUMER'S PROBLEM

Modeling of Preferences

The representative consumer derives utility from consuming goods from a wide variety of product groups and categories. We may represent this utility, U, by a general utility function, G,

(1) $U = G(\chi_1, \chi_2, \ldots, \chi_I)$

where χ_i is a vector of alternatives (e.g., brands) in product category i. In marketing one imposes (often implicitly) a condition of weak separability on G(·) such that U may be written as:

(2) $U = G[G_1(\chi_1), G_2(\chi_2), \ldots, G_I(\chi_I)]$

and the subutility function for some group of alternatives, $G_i(\chi_i)$, is modeled without explicit reference to G(·). Furthermore, it is assumed that a mapping exists between a set of characteristics, Z_i, and the group of alternatives χ_i such that every alternative, $\chi_t^i \in \chi_i$, may be described as a combination of the elements in Z_i. Likewise, it is assumed that the individual's <u>utility</u> for any alternative in χ_i may be modeled as some combination of the individual's utilities for each of the elements in Z_i. So the utility function for alternatives in χ_i may be expressed generally as

(3) $U_i = G(\chi_i) = h_i(Z_i)$.

We shall express h(·) in the form of a random utility function

(4) $U_i = h_i(Z_i) = V_i(Z_i) + e(Z_i)$

where V is a utility component corresponding to the representative consumer and e represents the idiosyncratic deviation of the individual's utility from V in modeling U. In the context of a product concept test, one obtains evaluations on a set of alternatives X that represent some χ; and each alternative in X is described in terms of a vector of characteristics Z^o, where $Z^o \subset Z$. Accordingly, the researcher is likely to encounter some conventional specification problems in modeling individual level preferences using X and Z^o. We now address the two potential sources of misspecification of the preference model.

Misspecification (1): Incorrect X

If $\chi \cup X - \chi \cap X$ is non-empty, then the researcher is required to make some assumptions about the individual's preferences for alternatives in χ that are not elements of X. Given the separability assumption on G, an expedient means of accounting for preferences for excluded alternatives is to introduce a budget constraint explicitly into the analysis. We assume that the individual uses a two-stage budget procedure (cf. Deaton and Muellbauer [1980]) such that in the first stage he apportions a global budget B according to intended allocations within each χ_1, χ_2, ..., χ_I. We denote the budget portions as $\mathbf{b}_1$, $\mathbf{b}_2$, ..., $\mathbf{b}_I$. If we obtain the individual's preference ordering for the alternatives in some $X_i \in \chi_i$ in the presence of $\mathbf{b}_i$, then the individual could register his preference for each alternative in X_i and for $\mathbf{b}_i$. The individual's preference for b_i could be interpreted as his preference for alternatives outside of the set X_i.

Misspecification (2): Incorrect Z

When representing choice alternatives parsimoniously as bundles of characteristics, it is inevitable that the researcher will omit some elements of Z in an experimental setting. Indeed, to make the respondent's task of evaluating alternatives manageable, the researcher may choose to manipulate only a small number of characteristics (3 or 4) over delimited ranges even though additional characteristics or the same set of characteristics defined over wider ranges would better describe the alternatives. We partition $Z = (Z_1, Z_2, \ldots, Z_K)$ as $Z = [Z^o, Z^u]$ where

$Z^o = [z_1^o, \ldots, z_k^o]$ are observed (included) characteristics in the product concept test and Z^u is a vector of unobserved (excluded) characteristics. Using this simple partitioning of Z, we re-express (4) as

$$(5) \quad U = V(Z^o, Z^u) + \epsilon(Z^o, Z^u).$$

If one attempts to estimate U with no knowledge of Z^u, then the estimators of V are likely to be biased. An obvious approach to controlling for Z^u is to find some kind of proxy variable. Srinivasan (1982), for example, has argued that price can be used as a proxy variable for Z^u. Indeed, in the marketing research literature, a substantial set of empirical studies exploring the influence of price on consumers' evaluations of products has established that individuals tend to use price as a cue for unobservable qualities of products when available information about products is limited and where the salience of price varies inversely with the amount of information available to the consumer (cf. McConnell (1968); Tull, Boring, and Gonsior (1964); Stafford and Enis (1969), and in economics, Gabor and Granger (1966), for example).

The problem of using price as a proxy for Z^u is that price also performs a conventional function of allocating the individual's resources. It is this latter function that is most appropriate in attempting to extend the analysis in the product concept test to a market setting. Thus, the confounding of the Z^u-effect and the allocative effect of price must be reduced when preference measures are obtained by means of a conjoint analysis exercise. The procedure that we propose to reduce the confounding of the price effects requires that two preference orderings on X be obtained from each individual. These are labeled unconstrained and constrained preferences, respectively; see Rao (1972) for an earlier use of these constructs.

Preference Ordering 1 (Unconstrained Preferences). Denote by $U(\mathbf{b}^*)$ a preference ordering on X obtained under no budget constraint. The alternatives in X may be thought of as possible prizes in a lottery, and the individual is merely asked to express his preference for each alternative under the assumption that he wins the lottery. Under this scenario, price cannot perform an allocative function, and if it has any influence on the individual's preferences, then it must be as a signal for unobservable qualities of the alternatives. Price as proxy for Z^u is denoted as $\hat{Z}^u$.

If we adopt an additive form for $U(\mathbf{b}^*)$, then we have

$$(6) \quad U(\mathbf{b}^*) = V^*(Z^o,P) + \epsilon\mathbf{b}^*$$

where $\frac{\partial V^*}{\partial Z^o}$ and $\frac{\partial V^*}{\partial P}$ are the marginal utilities of Z^o and $\hat{Z}^u$, respectively, P denotes price, and $\epsilon\mathbf{b}^*$ is the idiosyncratic deviation of the individual's utility from $V^*(Z^o,P)$. If, for example, $U(\mathbf{b}^*)$ is linear and additive in Z^o and P, then $u(\mathbf{b}^*) = \alpha_0 + \alpha_1 Z^o + \alpha_2 P$. If $\alpha_2 \neq 0$, then we conclude that Z^u is non-empty.

Preference Ordering 2 (Constrained Preference). Denote by $U(\mathbf{b})$ a preference ordering on X obtained under the budget constraint **b**. This ordering is conditioned on the event that the individual would decide to choose from X. One could ask, for example, "which of these alternatives would you most prefer to buy, if you were to buy an alternative from the set?" If we adopt an additive form for $U(\mathbf{b})$, then we have

(7) $U(\mathbf{b}) = V(Z^o, P) + \epsilon\mathbf{b}$

where $\frac{\partial V}{\partial Z^o}$ is the marginal utility for Z^o and $\epsilon\mathbf{b}$ is the idiosyncratic deviation from $V(Z^o,P)$. In this case, $\frac{\partial V}{\partial P}$ accounts for the confounded effects of price, i.e., the Z^u-effect and the allocative effect of price. One can attempt to isolate the latter effect by expressing the difference between (7) and (6). Thus,

(8) $U(\mathbf{b}) - U(\mathbf{b}^*) = V(Z^o,P) - V^*(Z^o,P) + \epsilon\mathbf{b} - \epsilon\mathbf{b}^*.$

Assuming an additive representation in Z^o and P for V and V^*, we may write equation (8) as:

(9) $U(\mathbf{b}) - U(\mathbf{b}^*) = [V_1(Z^o) - V_1^*(Z^o)] + [V_2(P) - V_2^*(P)] + \epsilon\mathbf{b} - \epsilon\mathbf{b}^*.$

Here we interpret the term $[V_2(P) - V_2^*(P)]$ as the allocative effect of price. To illustrate the procedure, consider the illustration with one product feature, Z_1, and price, P.[2] A possible functional form for (6) and (7) would be

(6') $U(\mathbf{b}^*) = \alpha_0 + \alpha_1 Z_1 + \alpha_2 P + \epsilon\mathbf{b}^*$

(7') $U(\mathbf{b}) = \beta_0 + \beta_1 Z_1 + \beta_2 P + \epsilon\mathbf{b}.$

The difference equation, (8), becomes

(8') $U(\mathbf{b}) - U(\mathbf{b}^*) = (\beta_0-\alpha_0) + (\beta_1-\alpha_1)Z_1 + (\beta_2-\alpha_2)P + (\epsilon\mathbf{b}-\epsilon\mathbf{b}^*).$

In this case, one need only estimate equation (6') and equation (8') constraining $(\beta_1-\alpha_1)$ to zero. The main allocative effect of price is then revealed by the estimate of $(\beta_2-\alpha_2)$. The signaling effect is reflected in the estimate of α_2. In general, we expect that the signaling effect to be positive with high values associated with low levels of information available on product concepts. Similarly, we expect that the allocative effect to be negative for normal range budgets.

IDENTIFYING REPRESENTATIVE CONSUMERS

In conjoint analysis (cf. Moore (1980)) one typically aggregates the responses of individuals in conjunction with the estimation of the preference or choice model. One assumes that there exists some vector, Y, that controls for individual differences. Adopting the expression in (4) of individual level utility this approach suggests that the inclusion of Y in the empirical expression for U controls for elements of Z^u that are correlated with elements of Z^o. If one assumes that V is linear in its arguments (Z^o and Y) and Y includes socio-economic variables, then generalization to the level of a market segment is accomplished by expressing

$$(9) \quad \hat{U} = V(Z^o, \bar{Y})$$

where $\bar{Y}$ corresponds to the average values of the socio-economic characteristics of a (pre-defined) market segment. Aggregation to the total market is then accomplished by taking the weighted average of different $\hat{U}$'s, where the weights reflect the proportional representation of different segments (socio-economic groups) in the relevant population. Because the vector Y is introduced to minimize the bias in the estimates of the parameters of Z^o, the implicit assumption in conjoint analysis is that V is common to all individuals in the sample (and, ultimately, in the population).

The procedure that we propose as an alternative to the conventional aggregation methods is based on the concept of the representative consumer. Briefly, our procedure aims to group individuals in terms of their stated preferences before proceeding to the estimation stage. We recommend the pre-estimation aggregation on the grounds that the preference orderings should allow us to aggregate individuals into different preference groups. In terms of the general individual level utility model in (4), this means that each group should have a unique V. Hence, a unique representative consumer corresponds to each group. A set of background characteristics, Y, may be associated with each group after it has been formed.

Tests for Homogeneity of Preferences

Our procedure calls for ascertaining the degree of homogeneity of preferences of the individuals in the sample. We propose two diagnostic tests for consistency and transitivity for this purpose. (The same tests can be applied for any subgroup of individuals in the sample.)

The basic data for these tests are the preference measures (constrained or unconstrained) for the set of alternatives obtained from N individuals in the sample. First, for each individual, n, construct a dominance matrix, D_n, such that the i,j-th cell is defined as follows

$$(10)\quad d_{ij}^{n} = \begin{cases} 1, \text{ if } x_i \text{ is preferred to } x_j \\ 0, \text{ otherwise} \end{cases}$$

using the measures of preference.

Consistency Test

Construct the summary dominance matrix, SD, of the total sample of N individuals by combining additively the individual dominance matrices, D_n, such that the i,j-th cell is defined as follows:

$$(11)\quad sd_{ij} = \begin{cases} \sum_n d^n_{ij}, \text{ if } \sum_n d_{ij} > N/2, \\ N/2, \text{ if } \sum_n d_{ij} = N/2 \text{ and } i > j \text{ and} \\ 0, \text{ otherwise.} \end{cases}$$

Cells in which the frequency of individuals preferring x_i to x_j equals the frequency of individuals preferring x_j to x_i are non-zero only in one triangle of the SD matrix. The middle condition of (11) places (arbitrarily) the non-zero equal frequency entries in the upper triangle.

We define the consistency score for the total sample of individuals as

$$(12)\quad \overline{CS} = \sum_{\substack{i,j \\ i \neq j}} sd_{ij}/\binom{A}{2}$$

where A is the number of choice alternatives. Note that this sum effectively excludes the zero cells of the SD-matrix and that only A(A-1)/2 cells are added. The maximum possible score is N and the minimum possible score is N/2. The score can be viewed as an index of the "goodness of grouping", where a score of N indicates that the total sample is composed of individuals with perfectly consistent preferences and a score of N/2 indicates that the total sample is composed of individuals with minimally consistent preferences.

One test (cf. Corstjens and Gautschi, 1983) of the consistency of the preferences among the individuals in the total sample would entail measuring deviations of $\overline{CS}$ from the mean of a chance distribution of the choice of the dominant alternative in each pair of alternatives. With N individuals and a 50/50 chance of choosing either alternative in any pair, the chance distribution is binomial folded over N, N-1, N-2, ..., (N+1)/2 [if N is odd] or N/2 [if N is even]. The mean of this distribution is

$$(13)\ \mu_{Bin} = \sum_{k}^{N} k\, P_{Bin}(r=k;\ N;\ p=0.5)/(1- \sum_{0}^{k-1} P_{Bin}(r=k;\ N;\ p=0.5)$$

where k=N/2 for N even and (N+1)/2 for N odd. The variance is

$$(14)\ \sigma^2_{Bin} = [\sum_{k}^{N} k^2 P_{Bin}(r=K;N;P=0.5)/(1- \sum_{0}^{k-1} P_{Bin}(r=k;N;p=0.5))] - \mu^2_{Bin}$$

The relevant null hypothesis is H_0: $\overline{CS} = \mu_{Bin}$ versus H_1: $\overline{CS} > \mu_{Bin}$. Rejection of H_0 gives a crude indication that the preferences of the individuals in the total sample are sufficiently consistent to obviate a disaggregated analysis of individuals in the sample. We call this test a crude test because of its low power, i.e., it is difficult <u>not</u> to reject H_0, when N is large.

The consistency score in (12) depends upon N, the number of individuals in the sample. One way of comparing this measure across samples is to use $\overline{CS}/N$. An alternative way is to convert it to the 0-1 scale by the appropriate normalization.

Transitivity Tests

The "average" preference ordering of the total sample might be viewed as the preferences of the "benchmark" representative consumer. Because all individuals in the total sample will not likely have identical preference orderings, it would be useful to determine how stable the preferences of the benchmark representative consumer are. Under the worst possible case the representative consumer's preferences would appear to be randomly generated. The more random the preferences appear to be, the less confidence one should put in the predictions on the total sample. We propose an index of the stability of the benchmark representative consumer's preferences based on the incidence of intransitivity among triples of alternatives.

For each triple of alternatives, there are eight possible sets of pairwise orderings, of which two are explicitly intransitive at the level of the representative consumer. That is, from any D_n the two possible intransitive orderings for any three alternatives, x_i, x_j, x_k are defined as:

(15) $d_{ij} > d_{ji}$ and $d_{jk} > d_{kj}$ and $d_{ki} > d_{ik}$

and

$d_{ji} > d_{ij}$ and $d_{kj} > d_{jk}$ and $d_{ik} > d_{ki}$.

At any aggregate level, the detection of the two possible intransitive orderings must be sensitive to the stochastic nature of the data. Coombs (1964) suggests three tests--strong, moderate and weak--to detect intransitivity from a stochastic dominance matrix, such as SD. Using $\succ$ to denote strict preference, for any three alternatives x_i, x_j, x_k, if

$$\text{Prob}(x_i \succ x_j) \geq \text{Prob}(x_j \succ x_i)$$

and

$$\text{Prob}(x_j \succ x_k) \geq \text{Prob}(x_k \succ x_j)$$

then the ordering on x_i, x_j, x_k is intransitive if

(16) $\text{Prob}(x_i \succ x_k) < \max[\text{Prob}(x_i \succ x_j), \text{Prob}(x_j \succ x_k)]$, or if

(17) $\text{Prob}(x_i \succ x_k) < \min[\text{Prob}(x_i \succ x_j), \text{Prob}(x_j \succ x_k)]$, or if

(18) $\text{Prob}(x_i \succ x_k) < 0.5$.

The condition in (16) is referred to as the strong test, the condition in (17) is referred to as the moderate test, and the condition in (18) is referred to as the weak test for intransitivity (cf. Coombs (1964)]. In reference to the matrix SD, the relative frequency sd_{ij}/N is the maximum likelihood estimate of $\text{Prob}(x_i \succ x_j)$.

Under the worst possible case of a random preference ordering the distribution of the number of intransitive triples follows a binomial (T; π=0.25). The mean of the distribution is

$$\mu_{Int} = T\pi = \binom{A}{3} \times 0.25$$

where A is the number of alternatives in the choice set X, and $T = \binom{A}{3}$ is the number of triples. Denoting the number of observed intransitivities (using either the strong, moderate or weak test) by I, we can state the relevant hypothesis to test as:

(19) K_0: $I = \mu_{Int}$ versus K_1: $I > \mu_{Int}$

The Z-scores and the significance probability associated with that level of I at which K_0 cannot be rejected become useful indicators of the stability of the benchmark representative consumer's preferences.

Procedure

Our methodology involve four steps labeled A through D as follows.

Step A. Assess the preference homogeneity of the total sample.

Step B. Two-stage clustering for identifying representative individuals.

Step C. Assess the preference homogeneity of the subgroups.

Step D. Estimate the two price effects.

We will elaborate on each of these.

Step A. This step involves conducting the two tests discussed in the previous section using the constrained measures of preference for the sample as a whole. Usually, these tests will indicate that the sample is not homogeneous in which case Steps B and C are necessary.

Step B. Construct clusters C_1^*, C_2^*, ..., C_K^* of individuals according to the strength of the correlation of their unconstrained preferences, $U(b^*)$, for the alternatives in X. (A variety of clustering algorithms are available to accomplish this. See, for example, Romesburg (1984), Anderberg (1973) and Hartigan (1975).) For each cluster, C_k^*, construct sub-clusters C_{k1}, C_{k2}, ..., C_{kM_k} of individuals according to the strength of the correlation of their constrained preferences, U(b), for the alternatives in X. Let the size of a typical cluster, km be N_{km}.

Step C. For each sub-cluster, C_{km}, construct the dominance matrix, D_{km}, from the dominance matrices of all individuals in the sub-cluster using the definition in (11). For each sub-cluster C_{km} compute the consistency score $\overline{CS}_{km}$, using the definition in (12). The consistency score for any given C_{km} can be compared with that of the benchmark representative consumer (i.e., the total sample). The difference in the proportion of consistent individuals in the subgroup and the total sample becomes a suitable index of the "goodness-of-grouping" for the sub-cluster. Indeed, if this proportion for any cluster significantly exceeds that of the total sample, then, the resulting sub-cluster qualifies as a specific representative consumer for purposes of estimating the preference functions. Moreover, for each resulting sub-cluster, one can search for background characteristics, Y, that distinguish individuals in any one cluster from individuals in other clusters.

It will be of interest to test the hypothesis that the subgrouping procedure has improved the total consistency taking all the subgroups together compared with that of the ungrouped case of the total sample. For this purpose, we can use the measure, $R = \sum_{k}\sum_{m} \overline{CS}_{km}$ which approximately measures the "degree of consistency" in the subgroups taken together and set up the null hypothesis:

(20) L_0: $R = \overline{CS}$ against the alternative, L_1: $R > \overline{CS}$.

Noting that the statistic, R, can be built up from several binomial variables corresponding to each subgroup, we can compute the variance of R as

$$Var(R) = \sum_k \sum_m N_{km} P_{km} (1 - P_{km})$$

where

$$P_{km} = \begin{cases} \frac{2}{N_{km}} (\overline{CS}_{km} - \frac{N_{km}}{2}) \text{ if } N_{km} \text{ is even; and} \\ \frac{2}{(N_{km}-2)} (\overline{CS}_{km} - \frac{N_{km}}{2} - 1) \text{ if } N_{km} \text{ is odd.} \end{cases}$$

A one-sided Z-test can be performed with the statistic, $Z = (R - \overline{CS})/\sqrt{Var(R)}$.

To assess the stability of the preferences of each sub-cluster one can conduct the intransitivity tests of (19). The larger the significance probability for the rejection of K_0, the less confident should one be in generalizing the empirical utility functions, calibrated in the laboratory, to the ultimate market. In some sense, a high incidence of intransitivity may indicate a propensity for individuals in the corresponding sub-cluster to switch among brands or alternatives in the actual market.

The advantages of the subgrouping and the concept of the representative consumer may be illustrated with an example. Assume there are six individuals who (each) have evaluated six alternatives in the following manner (preference ranks in body of table).

Alternatives/Individuals	A	B	C	D	E	F
Q	1	2	1	2	3	3
R	2	4	2	4	6	5
S	3	6	3	6	5	6
T	4	1	4	1	2	4
U	5	3	5	3	4	2
V	6	5	6	5	1	1

The dominance matrix SD for these data for the total sample is shown below with zero entries omitted.

	Q	R	S	T	U	V
Q	-	6	6		5	4
R		-	5			4
S			-			
T	4	4	4	-	5	4
U		4	4		-	4
V			4			-

Then, the average consistency score for the total sample = 67/15 = 4.467; equivalently, the $\overline{CS}$/SIZE = 77.4%.

The following subgroupings would yield maximum consistency:

Subgroup	Individuals	$\overline{CS}$	$\overline{CS}$/SIZE
1	A, C	2.00	100%
2	B, D	2.00	100%
3	E, F	1.73	86.5%

In this example, the overall consistency has improved by the process of subgrouping. Maximum consistency is achieved for Subgroups 1 and 2 so that representative consumers clearly correspond to each of the subgroups for the purpose of estimation. The consistency score for Subgroup 3, though not maximum, exceeds that of the total sample so that one could treat the individuals in Subgroup 3 as a single unit as well.

Step D. Estimate the two price effects using the equations (6') and (8') described earlier.

Summary

The essential aspects of our methodology consist of changes in data collection, aggregation and estimation. These are schematically shown in Figure 1, which is quite self-explanatory.

Figure 1 Here

EMPIRICAL ILLUSTRATIONS

A. Overview

To enable an empirical examination of the issues raised by our methodology, we have conducted two small empirical studies, patterned after traditional conjoint analysis. In the first study, homemakers evaluated various hypothetical profiles of food processors while executives evaluated hypothetical profiles of portable microcomputers in the second. The food processor study enabled us to estimate the effects of price in a setting where the physical characteristics were more comprehensively described, while the microcomputer study provided an opportunity for the subjects to rely more on price for inferring the qualities of the product. The data collection and other procedures described in the paper are followed in both the studies. Various other details are described below.

B. Study Design

Food Processor Study

This study was conducted among an effective sample of 69 housewives between the ages of 25 and 55 selected from the metropolitan area of Paris, France.[3] In addition to price, four product characteristics were employed describing each product concept; see Table 1 for details. The reader may note the comprehensive description of the first attribute of product features. The experimental procedure enabled us to examine the effects of excluded attributes and the estimation of price effects.

Using an orthogonal design, sixteen profiles were developed from the 4x2x2x4x4 experimental design. Two other profiles were added for validation purposes.[4] Thus, each respondent evaluated eighteen profiles.

In the questionnaire, respondents were first asked to rate each of the eighteen food processor concepts in the absence of a resource constraint. This measure of unconstrained preference ($U(\mathbf{b}^*)$) was obtained according to the following scenario:

> Imagine that you have entered a sweepstakes in which the first prize is one of these [18] food processors. I am going to ask you to arrange these cards (describing the food processors) so that the food processor you would most like to win as first prize is on top, followed by the card describing the food processor you would next most like to win, and so forth until you reach the food processor you would least like to win.

They were asked to rate these on a 0 to 10 scale after this ordering.

The constrained preference measure, $U(\mathbf{b})$, is a rating on a 0 to 10 scale obtained from the scenario:

> Now imagine that you have won a sweepstake and you have received as your prize 1000 francs. Supposing you were to use the 1000 francs to buy a new food processor. Tell me for each of these eighteen food processors how much you would want to buy it using the 0 to 10 scale.

Portable Microcomputers

Forty-five executives attending an executive development program at INSEAD, France provided evaluations of twelve hypothetical portable microcomputers in this study. Each microcomputer was described on three attributes in addition to price. The attributes and levels were as follows:

Manufacturer:	IBM; IBM-compatible
Expandability:	Yes; No
Country of Manufacture:	Japan; France
Price (in 000's Francs):	15; 22.5; 30

The data collection procedure was similar to that of the food processor study. The unconstrained preferences were obtained under the scenario of a lottery as before and the constrained preferences were obtained using budget amounts estabished idiosyncratically by each respondent. Both the measures were ranks.

C. Analysis

The first step in our analysis for the two data sets was to form representative individual consumers and to test for the consistency and transitivity of responses as discussed above. Next, the effects of price--informational and allocative--were estimated using the linear specification of the utility functions.

D. Results

We will discuss the results separately for the two data sets.

Food Processor Data

The two-stage procedure described earlier was adopted to form "representative" consumers. First, the data on unconstrained preferences were subjected to the K-Means clustering method and four clusters were selected at the Stage 1 clustering. Each of these clusters was further subdivided into 2, 3, 4 subclusters using the constrained preference data by the K-Means method. Looking at the cluster sizes and compositions at each stage and the reduction in the trace, we selected nine subgroups as representative individuals. The relevant statistics on the reduction in the trace (i.e., within sum of squares for all measures) are shown in Table 2.

Table 2 Here

The tests on consistency and transitivity for these nine subgroups indicated that these subgroups were in fact quite different. Results are shown in Table 3. While few pass the consistency test, almost every subgroup passes the transitivity tests. The Z-statistic for the test (20) described earlier for examining the overall improvement of consistency is 0.79 for these nine subgroups and 1.19 for the six subgroups, 3, 4, 5, 6, 8, and 9; these are not statistically significant. Nevertheless, the comparison of the column $\bar{C}\bar{S}$/SIZE enables us to conclude here that in six of the nine subgroups, we have generated subgroups of individuals that are more consistent than the total sample as a unit. For the subgroups that "fail" in terms of consistency, the estimation should perhaps be conducted at the individual level.

Table 3 Here

We then estimated the signalling effect and allocative effect of price according to equations (6') and (8') for each subgroup. The results are shown in Table 4. (Detailed utility functions are displayed in Appendix Table 1.) These analyses show some interesting differences among the subgroups. First, the signalling effect of price is positive although generally quite small for six of these subgroups; one of these estimates is highly significant. Among those subgroups with negative estimates, only one of these is significant. Subgroup #1 imputes high quality for higher priced alternatives while Subgroup #7 appears suspicious of the quality inference of high prices. These results are·as expected since the experiment utilized a comparatively large amount of information on the physical characteristics of the products, thus diminishing the informational effects of price.

Table 4 Here

The allocative effect of price is highly significant for three of the subgroups. For the remaining subgroups, the sign of this effect is positive, but extremely small to be of any significance. In only three of these cases is the allocative effect of price so weak that the constrained preference measure is unnecessary to obtain judging from the values of R^2s and p-values for the F-test.

Portable Computers Data

We have identified eight representative individuals in these data. The clustering results are displayed in Table 5 show that we have accounted for about one-half of the variation in these data by the disaggregation procedure.

Table 5 Here

The consistency and transitivity tests shown in Table 6 clearly indicate that we have identified the subgroups who are highly homogeneous within and different from one another. In every case, the subgroups pass both the consistency and transitivity tests. In this illustration, the $\overline{CS}$/SIZE for each subgroup is larger than that of the total sample indicating the clear advantages of disaggregation. The Z-statistic for the hypothesis (20) is 5.71, which is very highly significant showing that the subgrouping process has generated subgroups which are more consistent than the total sample.

Table 6 Here

The estimates of informational and allocative effects of price for these subgroups are shown in Table 7. The fits of the model of unconstrained preference are excellent in almost every case. (Detailed results are shown in Appendix Table 2.)

The informational (signalling) effects of price are very strong with appropriate signs (i.e., positive) for all but two subgroups. One of these subgroups (#3), is too small to be of any consequence. The signaling effect of price for subgroup #4 is negative indicating that these individuals are generally suspicious of the quality of higher priced concepts.

Table 7 Here

The fits of this model for estimating the allocative effect of price are generally acceptable except one case suggesting that the individuals in that subgroup are price insensitive within the price range presented. The allocative effect is significant for every subgroup, and its sign is negative (as expected) for all Subgroup #4. We have examined closely the preference data for Subgroup (#4) and have found that these individuals most prefer a collection of low priced and higher priced alternatives under the constrained situation. This suggests that the preference functions are probably U-shaped, thus not conforming to the linear functions we have used in the estimation.

Summary

These empirical illustrations show the viability of our methodology in dealing with the specification problems raised with regard to conjoint analysis. We have also shown how to segregate a sample of individuals into subgroups, each corresponding to a specific representative consumer, that is, each subgroup has a unique V. Furthermore, we have demonstrated that the informational and allocative effects are not necessarily the same for these subgroups. The illustrations also show that the price effects are very strong when only limited information on the choice alternatives is provided to respondents in the conjoint experiment.

DISCUSSION

This paper presented a methodology to deal with the two specification issues relevant to applications of conjoint analysis for testing product concepts. The issues of specification of the set of competing items and incomplete information in the profile description can be handled by collecting two sets of preference data under no constraint and under a budget constraint. While price can be used a proxy for the information not included in the profile, the two effects of price--allocative and informational--are usually confounded. Our methodology shows how these two effects can be separately estimated.

The two empirical illustrations show how the methodology can be applied to practical problems. The subgrouping procedure and corresponding tests worked very well in both the studies. The study on food processors showed that the effects of price can be very small when the alternative concepts are described relatively comprehensively. This finding is quite consistent with the literature on price-quality relationships. Further, the estimates obtained in this study are consistent with our expectations. In contrast to the food processors data, the study on portable computers showed more positive results. The effects of price--informational and allocative--are more pronounced in this case. One anomaly detected is possibly due to a non-linear preference function for that subgroup.

Our methodology offers a defensible way of identifying representative individuals (subgroups) since it is based on the complete vectors of preferences for the concepts. This approach is highly consistent with the marketing concept. We have proposed and implemented various tests for preference homogeneity which provide confidence in the stage of estimation.

Several directions for future research may be identified. First, the relationship between the tests on consistency and transitivity and the potential for switching brands should be explored. Once this relationship is established, our test procedure will provide a powerful way of identifying target markets for a new product concept. The effectiveness of the segmentation scheme should be compared to more standard schemes using background characteristics.

Another research direction is to devise additional statistical tests on the preference homogeneity with higher power. While we have utilized only the linear function in estimating price effects, the implications of nonlinear functional forms should be investigated further.

The estimates of allocative and informational effects of price for the representative individuals can be directly employed in identifying market targets. For example, the groups with a negative informational effect may be skeptical consumers prone to feeling "ripped off" in the marketplace while the groups with a positive allocative effect may be gullible consumers. The latter group may be influenced by snob appeal or may place high confidence in products with high prices due to uncertainty of perceptions of concepts.

The investigation of the effects of varying budgets on the constrained preferences for concepts will be another worthwhile pursuit in the future. These studies will show how the allocative effect of price varies with changes in budget arising possibly from borrowing.

Figure 1

ESSENCE OF OUR METHODOLOGY

Issues	Solution of the Methodology
A. SPECIFICATION OF UTILITY	
1. Set of Competing Alternatives is Not Well Defined.	1. Obtain Two Preference Orderings (Unconstrained and under a budget constraint).
2. Information on Alternatives is Not Complete.	2. Use price as a proxy variable.
B. IDENTIFYING REPRESENTATIVE INDIVIDUALS	
3. Methods of Aggregation Using Background Characteristics Are Not Necessarily Consistent With the Precepts of Economic Theory.	1. Two-Stage Clustering Procedure (Pre-Estimation) Using Unconstrained Preferences First, Followed by Constrained Preferences.
	2. Perform Various Diagnostic Tests on the Goodness of Grouping and Identification of Representative Individuals.
C. ESTIMATION OF THE TWO PRICE EFFECTS	
4. The Two Price Effects Are Usually Confounded in the Traditional Methods of Estimation; Separation of Informational and Allocative Effects of Price is Not Apparent.	1. Estimate the Informational Effect of Price from Unconstrained Preference and the Allocative Effect of Price from Difference of Constrained and Unconstrained Preference for the Representative Consumer.

Table 1

FOOD PROCESSORS: ATTRIBUTES INCLUDED IN THE STUDY

Attribute		Levels
Z_1: PRODUCT FEATURES	A	2 discs (for grating; for slicing) +1 knife (stainless steel) for chopping, peeling, mixing 550 Watts/bowl of 1.8 litres
	B	3 discs (for grating; for slicing; for preparing french fries +1 knife (stainless steel) for chopping, peeling, mixing 600 Watts/bowl of 2.2 litres
	C	3 discs (for grating; for slicing; for preparing french fries +1 knife (stainless steel) for chopping, peeling, mixing +1 plastic mixing knife 600 Watts/bowl of 2.4 litres
	D	3 discs (for grating; for slicing; for preparing french fries +1 knife (stainless steel) for chopping, peeling, mixing +1 plastic mixing knife 700 Watts/bowl of 2.8 litres
Z_2: COUNTRY OF MANUFACTURER	A	France
	B	U.S.A.
Z_3: VENDOR	A	Hypermarche (e.g., Carrefour)
	B	Direct Mail Order (e.g., Trois Suisses)
Z_4: GUARANTEE	A	2 years
	B	3 years
	C	4 years
	D	5 years
P: PRICE	A	800 francs (w/credit, payments of 200, 220, 220, 220 francs)
	B	1,000 francs (w/credit, payments of 250, 275, 275, 275 francs)
	C	1,200 francs (w/credit, payments of 300, 330, 330, 330 francs)
	D	1,400 francs (w/credit, payments of 350, 385, 385, 385 francs)

Table 2

SOME STATISTICS ON CLUSTERING FOR FOOD PROCESSOR DATA

Stage 1: Unconstrained Preferences

Number of Groups	% Trace	Cluster Sizes 1	2	3	4
1	100%	69			
2	70.3	22	47		
3	57.9	15	36	18	
*4	52.3	13	19	11	26

*Selected for second stage.

Stage (2): Constrained Preferences

Stage 1 Cluster	Number of Subclusters in Stage 2					
	2		3		4	
	% Trace	Sizes	% Trace	Sizes	% Trace	Sizes
1	59	8*,5*	49	5,4,4	34	6,3,2,2
2	68	13,6	53	3*,11*,5*	44	9,6,2,2
3	66	8*,3*	48	6,3,2	34	4,3,2,2
4	56%	12*,14*	40%	15,8,3	32%	8,8,7,3

*Selected as representative individuals.

Table 3

CONSISTENCY AND TRANSITIVITY TESTS FOR SUBGROUPS FOR FOOD PROCESSOR DATA

Subgroup	SIZE	CONSISTENCY TEST			TRANSITIVITY TEST		
		$\overline{CS}$	Z	$\overline{CS}$/SIZE	STRONG	MODERATE	WEAK
1	8	5.55	0.75	69.3%	13.37	-7.42	-9.76
2	5	3.33	-0.17	66.7	21.37	-6.34	-7.32
3	3	2.66	0.95	88.8	-13.66	-13.66	-13.66
4	11	8.50	1.72	77.3	-2.73	-13.17	-13.47
5	5	4.11	1.10	82.2	-9.47	-13.47	-13.47
6	8	6.25	1.53	78.2	7.71	-10.83	-11.91
7	3	2.09	-0.38	69.6	26.93	-4.10	-4.29
8	12	8.93	1.65	74.4	0.20	-12.78	-12.98
9	14	10.78	2.15	77.0	-5.95	-13.66	-13.66
All	69	49.16	4.56	71.25	24.59	-0.49	-10.15

Table 4

ESTIMATES OF INFORMATIONAL AND ALLOCATIVE EFFECTS OF PRICE BY SUBGROUP FOR FOOD PROCESSOR DATA

Subgroup	Size	Informational Effect		Allocative Effect	
		Estimate (t-value)	R^2 (F;P-value)	Estimate (t-value)	R^2 (F;P-value)
1	8	0.004 (5.60)	.26 (6.11;0.0001)	-.004 (-3.04)	.07 (9.25;.003)
2	5	0.001 (0.85)	.17 (2.13;.05)	0.002 (0.15)	.0003 (0.22;.883)
3	3	.0002 (.34)	.74 (20.32;.001)	-0.008 (-4.84)	.338 (23.43;.0001)
4	11	-0.0001 (-0.26)	.51 (24.53;.0001)	0.0002 (.34)	0.0007 (0.12;.733)
5	5	0.0006 (1.12)	.57 (13.86;.0001)	-0.0024 (-2.13)	.055 (4.53;.04)
6	8	-0.001 (-1.21)	0.41 (11.89;.001)	0.0006 (0.50	.002 (.252;.017)
7	3	-.0054 (-2.60)	.07 (1.53;.184)	-0.004 (-2.55)	.124 (6.49;.014)
8	12	0.0005 (1.35)	.37 (15.63;.001)	0.0007 (1.25)	.008 (1.56;.21)
9	14	0.00002 (0.06)	.46 (26.4;.0001)	-.003 (-3.57)	.05 (12.78;.004)
All	69	0.0003 (1.11)	.13 (23.75;.0001)	-.0015 (-3.57)	.011 (12.76;.0004)

Table 5

SOME STATISTICS ON CLUSTERING FOR COMPUTER DATA

Stage 1. Unconstrained Preferences

Number of Clusters	% Trace	Size			
1	100	45			
2	75.6	33	12		
3	58.1	18	18	9	
*4	47.4	18	8	12	7

*Used in subsequent analysis.

Stage 2. Constrained Preferences

	Number of Subclusters					
	2		3		4	
Cluster	% Trace	Sizes	% Trace	Sizes	% Trace	Sizes
1	47.8	9*,9*	40.7	9,6,3	29.4	8,5,3,2
2	59.8	2*,6*	31.9	5,2,1	27.0	5,1,1,1
3	54.7	4*,8*	43.6	8,3,1	33.3	7,3,1,1
4	47.7	3*,4*	20.0	4,2,1	15.3	3,2,1,1

*Used as representative individuals.

Table 6

CONSISTENCY AND TRANSITIVITY TESTS FOR SUBGROUPS FOR COMPUTER DATA

		CONSISTENCY TEST			TRANSITIVITY TEST		
Subgroup	SIZE	$\overline{CS}$	Z	$\overline{CS}$/SIZE	STRONG	MODERATE	WEAK
1	9	8.33	3.03	92.5%	-6.70	-8.41	-8.56
2	9	7.99	2.64	88.8	-6.07	-8.25	-8.56
3	2	2.00	1.41	100.0	-8.56	-8.56	-8.56
4	6	5.22	1.89	87.0	-0.31	-8.10	-8.10
5	4	3.67	1.72	91.8	-2.02	-7.63	-7.78
6	8	7.47	2.86	93.4	-3.58	-8.56	-8.56
7	3	2.34	0.21	78.0	2.34	-7.01	-7.16
8	4	3.65	1.69	91.3	-4.52	-8.10	-8.10
All	45	29.86	2.33	66.3	7.94	-4.05	-6.38

Table 7

ESTIMATES OF INFORMATIONAL AND ALLOCATIVE EFFECTS OF PRICE BY SUBGROUP FOR COMPUTER DATA

Subgroup	Size	Informational Effect		Allocative Effect	
		Estimate (t-value)	R^2 (F;P-value)	Estimate (t-value)	R^2 (F;P-value)
1	9	.05 (2.86)	0.91 (255.4;0.0001)	-0.06 (-2.40)	0.05 (5.77;0.018)
2	9	.10 (4.23)	0.82 (114.3;0.0001)	-0.51 (-11.62)	0.56 (134.96;0.0001)
3	2	-0.13 (-∞)	1.0 (∞;0.0001)	-0.35 (-3.90)	0.41 (15.18;0.0008)
4	6	-0.25 (-7.28)	0.75 (51.09;0.0001)	0.20 (3.63)	0.16 (13.15;0.0005)
5	4	0.20 (5.94)	0.84 (56.28;0.0001)	-0.64 (-10.40)	0.70 (108.15;0.0001)
6	8	0.13 (5.71)	0.85 (127.49;0.0001)	-0.15 (-4.57)	0.18 (20.92;0.0001)
7	3	0.28 (2.85)	0.23 (2.26;0.0418)	-0.16 (-2.12)	0.12 (4.47;0.0001)
8	4	0.47 (12.56)	0.81 (45.77;0.0001)	-0.96 (-17.99)	0.88 (323.76;0.0001)
All	45	0.09 (5.560)	0.55 (165.11;0.0001)	-0.28 (-12.91)	0.24 (166.56;0.0001)

Appendix Table 1

PREFERENCE REGRESSION RESULTS BY SUBGROUP FOR THE FOOD PROCESSOR DATA

Variable/Subgroup	1	2	3	4	5	6	7	8	9	All
UNCONSTRAINED PREFERENCE										
INTERCEPT	1.21	2.20	8.31	7.84	7.23	6.18	10.44	8.50	8.33	6.77
	(1.23)	(1.19)	(12.76)	(10.41)	(9.46)	(5.88)	(3.59)	(14.98)	(20.83)	(16.57)
FEATURE 1	.92	1.80	-3.21	-4.09	-2.98	-3.64	-1.96	-2.47	-2.21	-2.15
	(2.16)	(2.24)	(-11.36)	(-12.53)	(-8.97)	(-7.99)	(-1.55)	(-10.04)	(-12.71)	(-12.15)
FEATURE 2	.45	1.20	-2.38	-2.40	-2.10	-2.36	-1.67	-1.40	-1.47	-1.39
	(1.06)	(1.50)	(-8.41)	(-7.34)	(-6.33)	(-5.18)	(-1.32)	(-5.66)	(-8.49)	(-7.82)
FEATURE 3	-.05	.08	-1.58	-1.45	-.85	-1.63	-1.29	-.79	-.90	-0.93
	(-.11)	(.09)	(-5.61)	(-4.45)	(-2.56)	(-3.57)	(-1.02)	(-3.21)	(-5.20)	(-5.23)
COUNTRY	.38	1.49	.17	-.04	-.14	-.05	-.21	-.07	.11	0.14
	(1.27)	(2.82)	(.84)	(-.17)	(-.59)	(-.15)	(-.23)	(-.38)	(.91)	(1.12)
VENDOR	.13	.10	.03	-.13	.15	-.11	.45	-.04	.07	0.03
	(.43)	(.17)	(.13)	(-.54)	(.63)	(-.34)	(.49)	(-.22)	(.52)	(0.21)
GUARANTEE	.07	.04	.09	.24	.03	.53	.31	.02	.18	0.17
	(.54)	(.18)	(.98)	(2.35)	(.33)	(3.67)	(.77)	(.27)	(3.28)	(3.06)
PRICE	.0039	.0011	.00016	-.00014	.0006	-.00089	-.0054	.00054	.00002	0.0003
	(5.60)	(.85)	(.34)	(-.26)	(1.12)	(-1.21)	(-2.80)	(1.35)	(.06)	(1.11)
R^2	.263	.171	.781	.505	.574	.409	.212	.373	.481	0.132
$\bar{R}^2$	.220	.091	.742	.485	.533	.375	.074	.349	.444	0.128
F	6.113	2.126	20.319	24.528	13.884	11.886	1.533	15.628	28.394	23.75
df	7,120	7,72	7,40	7,168	7,72	7,120	7,40	7,184	7,216	7,1096
CONSTRAINED PREFERENCE - UNCONSTRAINED PREFERENCE										
INTERCEPT	3.03	1.52	7.33	-1.09	-.97	-.11	3.36	-1.89	-1.72	-0.29
	(2.25)	(-1.54)	(3.88)	(-1.38)	(-.76)	(-.09)	(1.75)	(-2.90)	(-1.95)	(-0.82)
PRICE	-.00365	.00136	-.00815	.00024	-.00241	.00055	-.00435	.00073	-.00281	-0.0015
	(-3.04)	(.147)	(-4.84)	(.34)	(-2.13)	(.50)	(-2.55)	(1.25)	(-3.57)	(-3.57)
R^2	.068	.0003	.338	.0007	.055	.002	.124	.008	.054	0.011
$\bar{R}^2$	.061	-.013	.323	-.005	.043	-.006	.105	.003	.050	0.011
df	1,126	1,78	1,46	1,174	1,78	1,126	1,46	1,190	1,222	1,1102
Size of Subgroup	8	5	3	11	5	8	3	12	14	69

Appendix Table 2

PREFERENCE REGRESSION RESULTS BY SUBGROUP FOR COMPUTER DATA

Variable/Subgroup	1	2	3	4	5	6	7	8	All
UNCONSTRAINED PREFERENCE									
Intercept	-11.86 (27.54)	-13.11 (21.24)	-8.00 (∞)	-4.49 (5.10)	-15.08 (17.50)	-13.37 (22.70)	-12.25 (4.90)	-18.26 (19.01)	-12.10 (28.68)
D.V. IBM	5.91 (28.69)	5.70 (19.33)	3.0 ()	2.69 (6.41)	2.50 (6.07)	2.29 (8.14)	0.78 (0.65)	1.67 (3.63)	3.64 (18.06)
D.V. EXPANDABILITY	2.83 (13.76)	2.26 (7.66)	6.0 (∞)	4.42 (10.5)	5.00 (12.13)	5.71 (20.27)	0.78 (0.65)	1.42 (3.09)	3.51 (17.40)
D.V. JAPAN	-0.17 (-0.81)	0.78 (2.64)	0 (0)	0.03 (0.07)	1.00 (2.43)	-0.17 (-0.59)	-0.33 (-0.28)	-0.75 (-1.63)	0.10 (0.48)
PRICE	0.05 (2.86)	0.10 (4.23)	-0.13 (∞)	-0.25 (-7.28)	0.20 (5.94)	0.13 (5.71)	0.28 (2.85)	0.47 (12.56)	0.09 (5.60)
R-Square	0.91	0.82	1.0	0.75	0.84	0.85	0.23	0.81	0.55
Adj. R-Square	0.90	0.81	1.0	0.74	0.83	0.84	0.13	0.79	0.55
F-Ratio	255.4	114.3	∞	51.09	56.28	127.49	2.26	45.77	165.11
D.F.	4,103	4,103	4.19	4,67	4,43	4,91	4,31	4,43	4,535
CONSTRAINED - UNCONSTRAINED PREFERENCE									
Intercept	1.25 (2.32)	11.49 (11.2)	7.88 (3.76)	4.44 (3.40)	14.18 (9.92)	3.47 (4.41)	3.47 (2.02)	21.56 (17.36)	6.33 (12.45)
PRICE	-0.06 (-2.40)	-0.51 (-11.62)	-0.35 (-3.90)	0.20 (3.63)	-0.64 (-10.40)	-0.15 (-4.57)	-0.16 (-2.12)	-0.96 (-17.99)	-0.28 (12.91)
R-Square	0.05	0.56	0.41	0.16	0.70	0.18	0.12	0.88	0.24
Adj. R-Square	0.04	0.55	0.38	0.15	0.69	0.17	0.09	0.87	0.23
F-Ratio	5.77	134.96	15.18	13.15	108.15	20.92	4.47	323.76	166.56
D.F.	1,106	1,106	1,22	1,70	1,46	1,94	1,34	1,46	1,538
Size of Subgroup	9	9	2	6	4	8	3	4	45

t-statistics in parentheses.

FOOTNOTES

1. Further, it is assumed that the consumer has no opportunity for resale of the item.

2. While we have used linear functional forms here, the general argument will extend to other forms as well. For example, in a model with interactions between Z_1 and P, there will be two effects of price--main allocative effect, $\beta_2 - \alpha_2$ and its effect on the interaction, $\beta_3 - \alpha_3$ where α_3 and β_3 are the coefficients for the product term, Z_1P.

3. The experiment consisted of another sample of about 60 housewives who were administered the same design with profiles described on one less attribute. We have analyzed these data also and the results are quite similar to those shown for food processors.

4. We will not utilize the data for these two profiles given our concern for specification issues in this paper.

REFERENCES

Anderberg, M.R. (1973), Cluster Analysis for Applications, New York: Academic Press.

Coombs, C.H. (1964), A Theory of Data, New York: John Wiley & Sons.

Corstjens, M. and D.A. Gautschi (1983), "Conjoint Analysis: A Comparative Analysis of Specification Tests for the Utility Function," Management Science, 29 (December), 1393-1413.

Deaton, A. and J. Muellbauer (1980), Economics and Consumer Behavior, Cambridge: Cambridge University Press.

Gabor, A. and C.W.J. Granger (1966), "Price as an Indicator of Quality: Report on an Enquiry," Econometrica, 33, 43-70.

Green, P.E. and V.R. Rao (1971), "Conjoint Measurement for Quantifying Judgmental Data," Journal of Marketing Research, 8, 355-363.

Green, P.E. and V. Srinivasan (1978), "Conjoint Analysis in Consumer Research: Issues and Outlook," Journal of Consumer Research, 5, 103-123.

Green, P. and Wind Y. (1975), "A New Way to Measure Consumers' Judgments," Harvard Business Review, 53, 107-117.

Hartigan, J.A. (1975), Clustering Algorithms, New York: John Wiley & Sons.

Hauser, J. and Simmie, P. (1981), "Product Realizations: Selections of Physical Features and Price to Achieve a Profit Maximizing Perceptual Position," Management Science, 27, No. 1, 33-56.

Hauser, J. and Urban, G. (1982), "Prelaunch Forecasting of New Consumer Durables: Ideas on a Consumer Value-Priority Model," n Analytic Approaches to Product and Marketing Planning, R. Srivastave and A. Shocker (eds.), Marketing Science Institute, Cambridge, Mass., 276-296.

Lancaster, K. (1971), Consumer Demand: A New Approach, New York: Columbia University Press.

Levitt, T. (1960), "Marketing Myopia," Harvard Business Review, 38, 24-47.

McConnell, J. (1968), "The Price-Quality Relationship in an Experimental Setting," Journal of Marketing Research, 5, 300-303.

McFadden, D. (1974), Conditional Logit Analysis of Qualitative Choice Behavior," in P. Zarembka (ed.), Frontiers in Econometrics, New York: Academic Press.

McFadden, D. (1976), "Quantal Choice Analysis: A Survey," Annals of Economic and Social Measurement, 5, 363-390.

Moore, W.L. (1980), "Levels of Aggregation in Conjoint Analysis: An Empirical Comparison," Journal of Marketing Research, 17 (November), 516-523.

Rao, V.R. (1977), "Conjoint Measurement in Marketing Analysis," in J. Sheth (ed.), Multivariate Methods for Market and Survey Research, Chicago: American Marketing Association, 257-286.

Rao. V.R. (1972), "A Model for Brand Choice Under Price-Quality Hypothesis," Combined Proceedings of the American Marketing Association, Chicago, Illinois, 366-371.

Rao, V.R. and Gautschi, D.A. (1982), "The Role of Price in Individual Utility Judgments," in Choice Model for Buyer Behavior, Research in Marketing, Supplement 1, L. McAlister (ed.), JAI Press, 57-80.

Ratchford, B. (1980), "The Value of Information for Selected Appliances," Journal of Marketing Research, 17 (February), 14-25.

Romesburg, H. Charles (1984), Cluster Analysis for Researchers, Belmont, California: Lifetime Learning Publications.

Silk, A. and G. Urban (1978), "Pre-Test-Market Evaluation of New Packaged Goods: A Model and Measurement Methodology," Journal of Marketing Research, 15 (May), 171-91.

Spence, M. (1974), "Competitive and Optimal Responses to Signals: An Analysis of Efficiency and Distribution," Journal of Economic Theory, 7, 296-332.

Srinivasan, V. (1982), "Comments on the Role of Price in Individual Utility Judgments," in Choice Models for Buyer Behavior, Research in Marketing, Supplement 1, L. McAlister (ed.), JAI Press, 81-90.

Stafford, J.E. and B.M. Enis (1969), "The Price-Quality Relationship: An Extension," Journal of Marketing Research, 6, 456-458.

Tull, D., R. Boring and M. Gonsior (1964), "A Note on the Relationship of Price and Imputed Quality," Journal of Business, 37, 186-191.

LIST OF INSEAD RESEARCH WORKING PAPERS

80/01 **"Identifying cognitive style determinants of retail patronage**, by Christian PINSON, Arun K. JAÏN and Naresh K. MALHOTRA, January 1980.

80/02 **"Dimensions culturelles des conceptions de management - une analyse comparative internationale"**, par André LAURENT, Février 1980.

80/03 **"Cognitive style and effective communication"**, by Arun K. JAÏN, Naresh K. MALHOTRA and Christian PINSON, December 1979.

80/04 **"Accomodative cognitive style differences in consumer reduction of alternatives"**, by Naresh K. MALHOTRA, Christian PINSON and Arun K. JAÏN, October 1979.

80/05 **"Stability and reliability of part-worth utility in conjoint analysis: a longitudinal investigation"**, by Arun K. JAÏN, Naresh K. MALHOTRA and Christian PINSON, September 1979.

80/06 **"The expected future spot exchange rate, the forward rate, and the trade balance"**, by Charles A. WYPLOSZ, March 1980.

80/07 **"Decline and adjustment: public intervention strategies in the European clothing industries"**, by José de la TORRE, July 1980.

80/08 **"The uncommon market: European policies towards a crisis industry - clothing in the 1970's"**, by José de la TORRE and Michel BACCHETTA, May 1980.

80/09 **"STRATPORT: a decision support system for strategic planning"**, by Jean-Claude LARRECHE and V. SRINIVASAN, April 1980, Revised October 1980.

80/10 **"A new approach to market segmentation strategy: a banking application"**, by Arun K. JAÏN, Christian PINSON and Naresh K. MALHOTRA, March 1980.

80/11 **"The exchange and interest rate term structure under risk aversion and rational expectations"**, by Charles A. WYPLOSZ, Revised Version, September 1980.

80/12 **"Individual cognitive differences in MDS analysis of perceptions"**, by Arun K. JAÏN, Naresh K. MALHOTRA and Christian PINSON, July 6-12, 1980.

80/13 **"STRATPORT: A model for the evaluation and formulation of business portfolio strategies"**, by Jean-Claude LARRECHE and V. SRINIVASAN, April 1980, Revised November 1980.

80/14 **"Les styles cognitifs : une nouvelle approche de la segmentation des marchés"**, par Christian PINSON, Naresh K. MALHOTRA and Arun K. JAÏN, Septembre 1980.

80/15 **"Cognitive styles: a new approach to market segmentation"**, by Christian PINSON, Naresh K. MALHOTRA and Arun K. JAÏN, March 1980.

81/01 **"Eurobanking, open market operations and the monetary base"**, by Herwig M. LANGOHR, August 1980.

81/02 **"Alternative approaches to the theory of the banking firm: a note"**, by Herwig M. LANGOHR, September 1980.

81/03 **"Why does beta shift when the length of securities returns varies?"**, by Gabriel A. HAWAWINI, December 1980.

81/04 **"Forward market and the cooperative firm"**, by Gabriel A. HAWAWINI, January 1981.

81/05 **"On some propositions regarding the behavior of the labor-managed firm under uncertainty"**, by Gabriel A. HAWAWINI, January 1981.

81/06 **"Impact of the investment horizon on the association between securities' risk and return: theory and tests"**, by Gabriel A. HAWAWINI and Ashok VORA, February 1981.

81/07 **"New evidence on beta stationarity and forecast for Belgian common stocks"**, by Gabriel A. HAWAWINI and Pierre A. MICHEL February 1981.

81/08 **"Industrial policy in the European Economic Community: crisis and change"**, by Kenneth S. COURTIS, June 1980.

81/09 **"Dogmatism as a moderator of banking behavior and attitudes"**, by Arun K. JAÏN, Christian PINSON and Naresh K. MALHOTRA, March 1981.

81/10 **"Investment horizon, diversification, and the efficiency of alternative beta forecasts"**, by Gabriel A. HAWAWINI and Ashok VORA, March 1981.

81/11 **"Organizational development & change"**, by Claude FAUCHEUX, Gilles AMADO and André LAURENT, April 1981.

81/12 **"The pricing of risky assets on the Belgian stock market"**, by Gabriel A. HAWAWINI and Pierre A. MICHEL, May 1981.

81/13 **"A test of the generalized capital asset pricing model"**, by Gabriel A. HAWAWINI and Ashok VORA, May 1981.

81/14 **"On the history of yield approximations"**, by Gabriel A. HAWAWINI and Ashok VORA, May 1981.

81/15 **"Pitfalls of the global product structure"**, by William H. DAVIDSON and Philippe C. HASPESLAGH, May 1981.

81/16 **"Adjusting beta estimates: real gains or illusions?"**, by Gabriel A. HAWAWINI and Ashok VORA, June 1981.

81/17 **"Do European industrial marketers budget differently? an international comparison via the advisor model"**, by David WEINSTEIN and Gary L. LILIEN, June 1981.

81/18 **"The internationalisation of manufacturing in the automobile industry - some recent trends"**, by Yves L. DOZ, April 1981.

81/19 **"Portfolio planning: use and usefulness"**, by Philippe C. HASPESLAGH, May 1981.

81/20 **"Production decisions in the mixed firm"**, by Claude J. VIALLET, October 1981.

81/21 **"Foreign investment and economic development: conflict and negotiation"**, by José de la TORRE, April 1981.

81/22 **"Forecasting country political risk"**, by José de la TORRE and David H. NECKAR, March 1981.

81/23 **"The impact of inflation on real variables: a general equilibrium approach"**, by Antonio M. BORGES, November 1981.

81/24 **"An assessment of the risk and return of French common stocks"**, by Gabriel A. HAWAWINI, Pierre A. Michel and Claude J. VIALLET, November 1981.

81/25 **"Mode de vie et style de vie : quatre observations sur le fonctionnement des termes"**, par Jean-François BERNARD-BECHARIES et Christian PINSON.

81/26 **"Simulating an oil shock with sticky prices"**, by Francesco GIAVAZZI, Mehmet ODEKON and Charles A. WYPLOSZ, November 1981.

81/27 **"Decomposing the impact of higher energy prices on long-term growth"**, by Antonio M. BORGES and Lawrence H. GOULDER.

81/28 **"Forecasting for industrial products"**, by David WEINSTEIN.

82/01 **"Estimating and adjusting for the intervalling-effect bias in beta"**, by Kalman J. COHEN, Gabriel A. HAWAWINI, Steven F. MAIER, Robert A. SCHWARTZ and David K. WHITCOMB, February 1980, Revised October 1981.

82/02 **"Friction in the trading process and the estimation of systematic risk"**, by Kalman J. COHEN, Gabriel A. HAWAWINI, Steven F. MAIER, Robert A. SCHWARTZ and David K. WHITCOMB, November 1981.

82/03 **"On the mathematics of Macaulay's duration: a note"**, by Gabriel A. HAWAWINI, December 1981.

82/04 **"Systematic risk, the investment horizons and the market index: an analytical examination"**, by Gabriel A. HAWAWINI and Ashok VORA, December 1981.

82/05 **"Why beta estimates depend upon the measurement interval"**, by Gabriel A. HAWAWINI, January 1982.

82/06 **"Nationalization, compensation and wealth transfer: an empirical note about the French experience"** by Herwig M. LANGOHR and Claude J. VIALLET, 1981/1982.

82/07 **"The Keynesian and classical determination of the exchange rate"**, by Emil-Maria CLAASSEN, May 1982.

82/08 **"The real exchange rate, the current account and the speed of adjustment"**, by Francesco GIAVAZZI and Charles A. WYPLOSZ, April 1982.

82/09 **"Simulation: a complementary method for research on strategic decision making processes"**, by Danielle NEES, May 1982.

82/10 **"The zero-root problem: dynamic determination of the stationary equilibrium in linear models"**, by Francesco GIAVAZZI and Charles A. WYPLOSZ, August 1982.

82/11 **"The theory of risk aversion and liquidity preference: a geometric exposition"**, by Gabriel A. HAWAWINI.

82/12 **"The effect of production uncertainty on the labor-managed firm"**, by Gabriel A. HAWAWINI and Pierre A. Michel.

82/13 **"On the independence between deposit and credit rates"**, by Jean DERMINE, September 1982.

82/14 **"Entrepreneurial activities of INSEAD MBA graduates"**, by Lister VICKERY, October 1982.

82/15 **"Proportional vs. logarithmic models of asset pricing"**, by Gabriel A. HAWAWINI, July 1982.

82/16 **"Capital controls: some principles and the French experience"**, by Emil-Maria CLAASSEN and Charles A. WYPLOSZ, October 1982.

82/17 **"The third world's campaign for a new international economic order"**, by Jan MURRAY, October 1982.

82/18 **"Extremity of judgment and personality variables: two empirical investigations"**, by Naresh K. MALHOTRA, Arun K. JAIN and Christian PINSON, April 1982. Revised July 1982.

82/19 **"Managerial judgment in marketing: the concept of expertise"**, by Jean-Claude LARRECHE and Reza MOINPOUR, Revised September and December 1982.

82/20 **"Uncertainty and the production decisions of owner-managed and labor-managed firms"** by Gabriel A. HAWAWINI, September 1982.

82/21 **"Inflation, taxes and banks' market values"**, by Jean DERMINE, January 1983.

82/22 **"Bank regulation and deposit insurance: adequacy and feasibility"**, by Jean DERMINE, February 1983 (second draft).

82/23 **"Pour une étude critique du différentiel sémantique"**, par Christian PINSON, Avril 1982.

83/01 **"Comparative financial structures: the impact of equity in bank portfolios"**, by Herwig M. LANGOHR, September 1983.

84/01 **"A technological life-cycle to the organisational factors determining gatekeeper activities"**, by Arnoud DE MEYER, November 1983.

84/02 **"La politique budgétaire et le taux de change réel"**, par Jeffrey SACHS et Charles A. WYPLOSZ, Novembre 1983.

84/03 **"Real exchange rate effects of fiscal policy"**, by Jeffrey SACHS and Charles A. WYPLOSZ, December 1983.

84/04 **"European equity markets: a review of the evidence on price behavior and efficiency"**, by Gabriel A. HAWAWINI, February 1984.

84/05 **"Capital controls and balance of payments crises"**, by Charles A. WYPLOSZ, February 1984.

84/06 **"An uncertainty model of the professional partnership"**, by Gabriel A. HAWAWINI, November 1983.

84/07 **"The geometry of risk aversion"**, by Gabriel A. HAWAWINI, October 1983.

84/08 **"Risk, Return and equilibrium of the NYSE: update, robustness of results and extensions"**, by Gabriel A. HAWAWINI, Pierre MICHEL and Claude J. VIALLET, December 1983.

84/09 **"Industry influence on firm's investment in working capital: theory and evidence"**, by Gabriel A. HAWAWINI, Claude J. VIALLET and Ashok VORA, January 1984.

84/10 **"Impact of the Belgian Financial Reporting Act of 1976 on the systematic risk of common stocks"**, by Gabriel A. HAWAWINI and Pierre A. MICHEL, January 1984.

84/11 **"On the measurement of the market value of a bank"**, by Jean DERMINE, April 1984.

84/12 **"Tax reform in Portugal: a general equilibrium analysis of the introduction of a value added tax"**, by Antonio M. BORGES, December 1984.

84/13 **"Integration of information systems in manufacturing"**, by Arnoud DE MEYER and Kasra FERDOWS, December 1984.

85/01 **"The measurement of interest rate risk by financial intermediaries"**, by Jean DERMINE, December 1983, Revised December 1984.

85/02 **"Diffusion model for new product introduction in existing markets"**, by Philippe A. NAERT and Els GIJSBRECHTS.

85/03 **"Towards a decision support system for hierarchically allocating marketing resources across and within product groups"**, by Philippe A. NAERT and Els GIJSBRECHTS.

85/04 **"Market share specification, estimation and validation: towards reconciling seemingly divergent views"**, by Philippe A. NAERT and Marcel WEVERBERGH.

85/05 **"Estimation uncertainty and optimal advertising decisions"**, by Ahmet AYKAC, Marcel CORSTJENS, David GAUTSCHI and Ira HOROWITZ, Second draft, April 1985.

85/06 **"The shifting paradigms of manufacturing: inventory, quality and now versatility"**, by Kasra FERDOWS, March 1985.

85/07 **"Evolving manufacturing strategies in Europe, Japan and North-America"**, by Kasra FERDOWS, Jeffrey G. MILLER, Jinchiro NAKANE and Thomas E. VOLLMANN.

85/08 **"Forecasting when pattern changes occur beyond the historical data"**, by Spyros MAKRIDAKIS and Robert CARBONE, April 1985.

85/09 **"Sampling distribution of post-sample forecasting errors"**, by Spyros MAKRIDAKIS and Robert CARBONE, February 1985.

85/10 **"Portfolio optimization by financial intermediaries in an asset pricing model"**, by Jean DERMINE.

85/11 **"Energy demand in Portuguese manufacturing: a two-stage model"**, by Antonio M. BORGES and Alfredo M. PEREIRA.

85/12 **"Defining a manufacturing strategy - a survey of European manufacturers"**, by Arnoud DE MEYER.

85/13 **"Large European manufacturers and the management of R & D"**, by Arnoud DE MEYER.

85/14 **"The advertising-sales relationship in the U.S. cigarette industry: a comparison of correlational and causality testing approaches"**, by Ahmet AYKAC, Marcel CORSTJENS, David GAUTSCHI and Douglas L. MacLACHLAN.

85/15 **"Organizing a technology jump or overcoming the technological hurdle"**, by Arnoud DE MEYER and Roland VAN DIERDONCK.

85/16 **"Commercial bank refinancing and economic stability: an analysis of European features"**, by Herwig M. LANGOHR and Antony M. SANTOMERO.

85/17 **"Personality, culture and organization"**, by Manfred F.R. KETS DE VRIES and Danny MILLER.

85/18 **"The darker side of entrepreneurship"**, by Manfred F.R. KETS DE VRIES.

85/19 **"Narcissism and leadership: an object relations perspective"**, by Manfred F.R. KETS DE VRIES and Dany MILLER.

85/20 **"Interpreting organizational texts"**, by Manfred F.R. KETS DE VRIES and Dany MILLER.

85/21 **"Nationalization, compensation and wealth transfers: France 1981-1982"**, by Herwig M. LANGOHR and Claude J. VIALLET 1, Final version July 1985.

85/22 **"Takeover premiums, disclosure regulations, and the market for corporate control. A comparative analysis of public tender offers, controlling-block trades and minority buyout in France"**, by Herwig M. LANGOHR and B. Espen ECKBO, July 1985.

85/23 **"Barriers to adaptation: personal, cultural and organizational perspectives"**, by Manfred F.R. KETS DE VRIES and Dany MILLER.

85/24 **"The art and science of forecasting: an assessment and future directions"**, by Spyros MAKRIDAKIS.

85/25 **"Financial innovation and recent developments in the French capital markets"**, by Gabriel HAWAWINI, October 1985.

85/26 **"Patterns of competition, strategic group formation and performance: the case of the US pharmaceutical industry, 1963-1982"**, by Karel O. COOL and Dan E. SCHENDEL, October 1985.

85/27 **"European manufacturing: a comparative study (1985)"**, by Arnoud DE MEYER.

86/01 **"The R & D/Production interface"**, by Arnoud DE MEYER.

86/02 **"Subjective estimation in integrating communication budget and allocation decisions: a case study"**, by Philippe A. NAERT, Marcel WEVERBERGH and Guido VERSWIJVEL, January 1986.

86/03 **"Sponsorship and the diffusion of organizational innovation: a preliminary view"**, by Michael BRIMM.

86/04 **"Confidence intervals: an empirical investigation for the series in the M-Competition"**, by Spyros MAKRIDAKIS and Michèle HIBON.

86/05 **"A note on the reduction of the workweek"**, by Charles A. WYPLOSZ, July 1985.

86/06 **"The real exchange rate and the fiscal aspects of a natural resource discovery"**, by Francesco GIAVAZZI, Jeff R. SHEEN and Charles A. WYPLOSZ, Revised version: February 1986.

86/07 **"Judgmental biases in sales forecasting"**, by Douglas L. MacLACHLAN and Spyros MAKRIDAKIS, February 1986.

86/08 **"Forecasting political risks for international operations"**, by José de la TORRE and David H. NECKAR, Second Draft: March 3, 1986.

86/09 **"Conceptualizing the strategic process in diversified firms: the role and nature of the corporate influence process"**, by Philippe C. HASPESLAGH, February 1986.

86/10 **"Analysing the issues concerning technological de-maturity"**, by R. MOENART, Arnoud DE MEYER, J. BARBE and D. DESCHOOLMEESTER.

86/11 **"From "Lydiametry" to "Pinkhamization": misspecifying advertising dynamics rarely affects profitability"**, by Philippe A. NAERT and Alain BULTEZ.

86/12 **"The economics of retail firms"**, by Roger BETANCOURT and David GAUTSCHI, Revised April 1986.

86/13 **"Spatial competition à la Cournot"**, S.P. ANDERSON and David J. NEVEN.

86/14 **"Comparaison internationale des marges brutes du commerce"**, par Charles WALDMAN, Juin 1985.

86/15 **"How the managerial attitudes of firms with FMS differ from other manufacturing firms: survey results"**, by Mihkel TOMBAK and Arnoud DE MEYER, June 1986.

86/16 **"Les primes des offres publiques, la note d'information et le marché des transferts de contrôle des sociétés"**, par B. Espen ECKBO et Herwig M. LANGOHR.

86/17 **"Strategic capability transfer in acquisition integration"**, by David B. JEMISON, May 1986.

86/18 **"Towards an operational definition of services"**, by James TEBOUL and V. MALLERET, 1986.

86/19 **"Nostradamus: a knowledge-based forecasting advisor"**, by Rob R. WEITZ.

86/20 **"The pricing of equity on the London stock exchange: seasonality and size premium"**, by Albert CORHAY, Gabriel HAWAWINI and Pierre A. MICHEL, June 1986.

86/21 **"Risk-premia seasonality in U.S. and European equity markets"**, by Albert CORHAY, Gabriel A. HAWAWINI and Pierre A. MICHEL, February 1986.

86/22 **"Seasonality in the risk-return relationships some international evidence"**, by Albert CORHAY, Gabriel A. HAWAWINI and Pierre A. MICHEL, July 1986.

86/23 **"An exploratory study on the integration of information systems in manufacturing"**, by Arnoud DE MEYER, July 1986.

EURO-ASIA CENTRE
CAMPUS INSEAD

Boulevard de Constance
77309 Fontainebleau Cedex, France
Telephone (1) 60 72 40 40
Telecopy (1) 60 72 40 49
Telex 690389

EAC PUBLICATIONS LIST

January 1980 - October 1985

EAC RESEARCH PAPERS

(Academic papers based on the research of EAC faculty and research staff)

n° 1 LASSERRE Philippe
A contribution to the study of entrepreneurship development in Indonesia. 1980.

n° 2 BOISOT Max and LASSERRE Philippe
The transfer of technology from European to ASEAN enterprises: strategies and practices in the chemical and pharmaceutical sectors. 1980.

n° 3 AMAKO Tetsuo
Possibilité d'un transfert à l'étranger des techniques japonaises de gestion du personnel: le cas français. 1982.

n° 4 LEHMANN Jean-Pierre
Japanese management in Germany. 1982.

n° 5 LEHMANN Jean-Pierre
La gestion japonaise en Allemagne. 1982.

n° 6 AHMAD Reyaz
Japanese investments in ASEAN. 1983.

n° 7 SCHUTTE Hellmut
Unternehmensstrategische Aspekte der internationalen Expansion mittel ständischer Unternehmen. 1983.

n° 8 SCHUTTE Hellmut
Wirtschaftliche Kooperation zwischen den ASEAN - Ländern und Nordrhein-Westfalen - Hemmungsfaktoren und Chancen für die deutsche wirtschaft. 1983.

nº 9 RABU Patrick
La présence française en Thaïlande. 1983.

nº 10 SPRECKLEY Bridget
South Korean chemical industry opportunities for foreign firms. 1983.

nº 11 SCHMITLIN Anne
La population active chinoise non-agricole. 1983.

nº 12 CUNNINGHAM Marc
Marketing and distribution for multinational companies in Indonesia: an overview. 1983.

nº 13 CHAPON Marie-Claude
Conditions de travail en Corée du Sud. 1984.

nº 14 ISHIYAMA Yoshihide
The political economy of liberalisation of the financial system in Japan. 1984.

nº 15 CHAPON Marie-Claude
Education in Korea. 1984.

nº 16 SCHÜTTE Hellmut
Exportfreihandelszonen - schwindende Attraktivität durch neue Produktionstechnologien. 1984.

nº 17 LASSERRE Philippe
Singapour comme centre régional. L'experience d'entreprises françaises. 1985.

nº 18 Von KIRCHBACH Friedrich
Patterns of export channels to developing Asia. 1984.

nº 19 MITTER Rajan
A survey of European business in India. 1984.

nº 20 SCHMITLIN Anne
Biens de production et biens de consommation en Chine. 1984.

nº 21 SCHMITLIN Anne
Les investissements étrangers en Chine. 1985.

EAC BRIEFING PAPERS

(Short synopses by EAC faculty and research staff)

n° 1 BOISOT Max and LASSERRE Philippe
Strategies and practices of transfer of technology from European to ASEAN enterprises. 1980.

n° 2 HEADLEY Stephen
The partners of foreign investors in Indonesia: the tip of the ethnic iceberg. 1980.

n° 3 HEADLEY Stephen
Foreword to government-business relations in Indonesia. 1980.

n° 4 HEADLEY Stephen
Personnel management in Indonesia: How ?. 1980.

n° 5 HEADLEY Stephen
Can you work for Honda and remain yourself ? The cultural dimension of Indonesian management. 1980.

n° 6 CONWAY Bryony
The context of management development in Malaysia. 1980.

n° 7 CONWAY Bryony
Racial balance in management in Malaysia. 1980.

n° 8 CONWAY Bryony
Appropriate education for management in Malaysia. 1981.

n° 9 CONWAY Bryony
Foreign enterprise and management development in Malaysia. 1981.

n° 10 CONWAY Bryony
The Chinese Malaysian enterprise. 1982.

EAC REPRINTS

(Reprints of major articles published by EAC faculty and research staff)

n° 1 de BETTIGNIES Henri-Claude
Japanese organizational behaviour: a psychocultural approach. 1973.

n° 2 de BETTIGNIES Henri-Claude
The transfer of management know-how in Asia: an unlearning process. 1980.

n° 3 de BETTIGNIES Henri-Claude
Korean management in the 1980's: the international challenge. 1980.

n° 4 de BETTIGNIES Henri-Claude
La sociologie des organisations: le cas du Japon. 1980.

n° 5 de BETTIGNIES Henri-Claude
Analyse des craintes françaises. 1980.

n° 6 LASSERRE Philippe
L'Indonésie et ses potentiels. 1981.

n° 7 LASSERRE Philippe
Transferts de technologie: des mariages difficiles. 1981.

n° 8 LASSERRE Philippe
The new industrializing countries of Asia: perspectives and opportunities. 1981.

n° 9 de RUGY Jacques
Le Japon prépare ses managers de demain à l'école de l'Occident. 1981.

n° 10 AMAKO Tetsuo
Quand les entreprises japonaises intègrent la gestion américaine. 1982.

n° 11 LASSERRE Philippe
Training: key to technological transfer. 1982.

n° 12 de BETTIGNIES Henri-Claude
Can Europe survive the Pacific century ?. 1982.

n° 13 LASSERRE Philippe
Strategic planning in South-East Asia: does it work ?. 1983.

n° 14 LEHMANN Jean-Pierre
Japan and the world economy: international accountability vs national interests. 1982.

n° 15 LEHMANN Jean-Pierre
Mutual images. 1982.

n° 16 LASSERRE Philippe
Technology transfer from a business policy point of view. 1982.

nº 17 LASSERRE Philippe
Co-ordinative practices in technology transfer. 1982.

nº 18 ESMEIN Jean
Le Japon et l'Asie. 1982.

nº 19 LASSERRE Philippe et Sé-Jung YONG
La modalité de l'acquisition de technologie dans les entreprises de pays en voie de développement. 1982.

nº 20 de BETTIGNIES Henri-Claude
Stratégies japonaises: conséquences pour les firmes européennes. 1982.

nº 21 SCHUTTE Hellmut
Drehscheibe aller Auslandsaktivitäten. 1983.

nº 22 LEHMANN Jean-Pierre
International competition and the Japanese benchmarks of success: what has the West learned so far ?. 1983.

nº 23 AHMAD Reyaz
Coping with Japan: Japanese investments in ASEAN and the need for rapid change. 1983.

nº 24 de BETTIGNIES Henri-Claude
The challenge of management training in Asia. 1983.

nº 25 LASSERRE Philippe
Strategic assessment of international partnership in ASEAN countries. 1983.

nº 26 LEHMANN Jean-Pierre
Prospects for development in the current international environment - the issue of free trade vs protectionism. 1983.

nº 27 LEHMANN Jean-Pierre
Perspectives de développement dans l'environnement international actuel. La question du libre commerce contre le protectionnisme. 1983.

nº 28 CHAPON Marie-Claude
Labour conditions in South Korea - new needs, new directions. 1984.

nº 29 SCHUTTE Hellmut
Micro-electronics versus cheap labour: questionmarks behind Asia's export successes. 1984.

nº 30 de BETTIGNIES Henri-Claude
Introduction of the book, Le management est-il un art japonais?. 1984.

EAC FORUM AND CONFERENCE PAPERS

(Papers presented at the EAC's annual forum or by EAC teaching or research staff at academic conferences).

n° 1 LASSERRE Philippe
Robots and flexible manufacturing systems: their contribution to the productivity dilemna. London, 1981.

n° 2 HUGUENIN Patrick and DEBROUX Philippe
European, Japanese and American investment in ASEAN. Singapore, 1981.

n° 3 PIGOSSI Richard
American investment in ASEAN: present situation and perspectives. Singapore, 1981.

n° 4 TAMAO Toyomitsu - Edited by DEBROUX Philippe
Japan's direct investments in ASEAN - current situation and prospects. Singapore, 1981.

n° 5 LASSERRE Philippe
Euro-ASEAN transfer of technology: some experiences and their implications for training. Kuala Lumpur, 1981.

n° 6 AMAKO Tetsuo
Relations entre les structures d'entreprises et les technologies au Japon - passé et avenir. Paris, 1982.

n° 7 AMAKO Tetsuo
Transférabilité de la gestion japonaise et cercles de qualité en France. Paris, 1982.

n° 8 DURHAM Kenneth
Protectionism, trade distortion and Euro-Asian relationships. Frankfurt, 1982.

EAC DOCUMENTATION SERIES

nº 1 A bibliography on Japan
Resources of the Euro-Asia Centre and INSEAD Library.
July 1982. 108 pages.

nº 2 A bibliography on ASEAN and ASEAN countries
Resources of the Euro-Asia Centre and INSEAD Library.
February 1983. 103 pages.

nº 3 A bibliography on the People's Republic of China
Resources of the Euro-Asia Centre and INSEAD Library.
August 1982. 18 pages.

nº 4 A bibliography on Asia
Resources of the Euro-Asia Centre and INSEAD Library.
February 1982. 25 pages.

nº 5 A bibliography on South Korea, Hong Kong and Taiwan
Resources of the Euro-Asia Centre and INSEAD Library.
January 1982. 22 pages