

**"EXPLAINING CROSS-COUNTRY DIFFERENCES  
IN PRICE AND DISTRIBUTION EFFECTIVENESS"**

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# **EXPLAINING CROSS-COUNTRY DIFFERENCES IN PRICE AND DISTRIBUTION EFFECTIVENESS**

## Abstract

The objective of this research is to test whether, and to explain why, the effectiveness of marketing instruments such as price and distribution coverage varies across countries. The issue is important when marketing a product in multiple countries. Despite much normative discussion about the globalization of markets and the desirability of international marketing program standardization, little analytical (compared to descriptive) empirical research to date addresses the issue. The case for standardization of allocation of marketing budgets to marketing mix variables rests on the validity of the assertion that variations in marketing mix effectiveness across countries are rather small. In this research, we provide empirical evidence about the degree of similarity in market response function coefficients among European countries in one established consumer convenience good market and analyze potential reasons for such differences. Notably, we find indication of substantial variations in marketing mix effectiveness in a manner related to level of economic maturity. In trading areas including countries of different economic maturity levels, this suggests that the marketing budget should be allocated differently internationally. This finding has direct implications about the likely impact of the European Union on Pan-European marketing Standardization

## **EXPLAINING CROSS-COUNTRY DIFFERENCES IN PRICE AND DISTRIBUTION EFFECTIVENESS**

The debate about the globalization of markets, reopened by Levitt (1983), will become increasingly critical with the changes occurring in world markets, in particular with the creation of unified economic spaces, e.g. in Europe and in North America. The proposition that “companies must learn to operate as if the world were one large market--ignoring superficial regional and national differences” (Levitt 1983) is not widely accepted within companies, nor within academia (Jain 1989, Walters 1986). Many multinational firms do not adhere to this complete standardization recommendation: they give a large degree of autonomy to country-subsiidiary marketing departments in defining their own marketing program and sometimes standardize on selected marketing mix elements, e.g. the product (Keegan 1989). In addition to advantages of decentralization of management styles and structures, this is often justified by pointing to differences in levels of consumer behavior (e.g. in quantity consumed), in levels of marketing instruments (e.g. tables comparing prices of identical items across EEC markets), or in market structure characteristics (e.g. market concentration) across markets.

However, is this type of evidence sufficient to rule out the potential advantages of adopting a uniform allocation of marketing resources to the marketing mix variables across markets? We think not. Excepting costs, such decisions have to be made on the basis of evidence concerning not the *levels* of such variables across markets, but concerning the market *impact* of such variables, ie. not on the basis of differences in price levels, for example, but on the basis of differences in price *responsiveness* between markets (although the impact could be related to the level). Allocating marketing resources optimally to respective countries depends on the elasticity in each country. In fact, standardization of resource allocation rules

requires that the elasticities of the different marketing mix instruments be proportional across countries. This follows from the Dorfman-Steiner theorem (1954), which states that the optimal values of the marketing mix variables are proportional to their respective elasticities. For two countries to exhibit the same proportional allocation of marketing resources across marketing mix variables, the ratio of the marketing mix elasticities needs to be similar across countries. Therefore, the fundamental condition for providing an opportunity for standardization of allocation of marketing resources is the proportionality of *responses* to marketing activities across countries. This proportionality occurs especially when the responses are similar in different countries. Then, countries that have similar marketing mix elasticities form segments within which the marketing programs are standardized (Smith 1956, Frank 1968). Although the optimal criterion for segment formation might not be the elasticities or response coefficients themselves, Tolleson and Lessig (1978) and Elrod and Winer (1982) propose segmentation methodologies which are based on the marketing mix elasticities. It is, therefore, important to know whether the responses are similar across countries to decide whether to group countries within segments or not. If responses are not similar, it is critical to understand why such differences might exist. Country characteristics might explain different elasticities in different countries.

While there is wide recognition of the *cost-based* benefits of standardizing marketing programs, no consensus exists to date regarding the appropriateness of such strategies on the basis of demand characteristics in competitive markets (Levitt 1983, Douglas and Wind 1987). This debate is partly due to the lack of empirical evidence regarding the extent of differences in responsiveness of demand to marketing mix policy across countries. The differences in the response functions to the marketing mix instruments across countries have not been the focus of the research to date (Farley and Lehmann 1994). An exception is Szymanski et al. (1993)

who compare the coefficients of predictors of SBUs' performance across countries using PIMS data. They conclude that the similar coefficients they found in the U.S., U.K., Canadian and Western European markets should lead to similar allocation of strategic resources (marketing mix variables) in these different countries. Farley and Lehmann (1994) also summarize using a meta-analysis approach cross-national differences in price and advertising elasticities: European advertising elasticities are higher than U.S. advertising elasticities and price elasticity is lower in Europe than in the U.S., although international differences are not systematically larger than differences due to the product type or due to the model specification or estimation method.

In general, however, the guidelines that a firm should follow concerning the standardization question have followed closely the logic of internalization of the firm such as discussed by Dunning (1981). These internalization approaches consider the balance between cost gains due to economies of scale that can be achieved when demand is homogeneous across countries and losses in demand when markets are heterogeneous. More specifically, the major arguments against standardization concern local differences in media, in stages of the product life cycle, and in cultures (for example, Douglas and Urban (1977) analyzed differences in women's preferences in the U.S. and France). These differences are weighed against the pros, which deal with economies which can be achieved with standardization (economies of scale and cost reductions due to implementing a single strategy), as well as greater efficiencies which might result from standardization. For example, the major reason for Sweden's Electrolux to buy the Italian Zanussi group was indeed the possibility of realizing economies of scale (Echikson 1993). Other reasons are often cited that support the idea that standardization increases the efficiency with which the brand is marketed. The first of these arguments is the need for an international brand where the image is consistent across markets

(Fatt 1967, Buzzell 1968). Another advantage is the gain in control by headquarters over the planning and execution of the strategy (Killough 1978). Finally, standardization can enable the firm to take advantage of the best of each country (e.g., the transfer of successful ideas), and more power can be concentrated at headquarters to maximize company expertise (Yip, Loewe and Yoshino 1988, Sorenson and Weichman 1975). However, none of these pros and cons deal explicitly with the differences or similarities of the responsiveness of demand across countries.

Thus, it is critical to know the response function in a country in order to judge the wisdom of importing to it a standard allocation of marketing resources. If the response coefficients do indeed differ by country, further insight will be gained if such differences can be understood, explained, predicted, and even managed. This analysis of the response functions can also help identify which elements of the marketing mix can be standardized because of similar elasticities and those which should not due to significant differences in elasticity. Not only would this contribute to the “validation” of the elasticity estimates, but it would help decide on how countries should be grouped or clustered to best take advantage of country similarities. Eger (1987), for example, insists on the importance of focusing on similarities rather than differences across countries, due to the development of worldwide communication networks (Onkvisit and Shaw 1987, Rutigliano 1986). This understanding is obtained in part by knowing which factors explain cross-country differences in the effectiveness of a marketing instrument. For example, different socio-cultural, market-structural, market-infrastructure or economic conditions might explain differences in marketing mix elasticities across countries.

The empirical analysis proposed in this research and described in detail below addresses this question in the context of a specific case. Our strategy in this research is to relate differences in marketing mix responsiveness to fundamental explanatory variables

related to the market or the country. At the same time, we attempt to demonstrate that clear answers to these questions can be obtained if the analysis is carried out using an appropriate design and analysis methodology-

This research is particularly critical at this point in time, as many companies are searching for a resolution of this debate in order to adjust their operations in the European Union, NAFTA, ASEAN, and other trading areas under formation. The removal of trade barriers has engendered speculation as to the economic and managerial consequences for firms. In particular, a reorganization of strategic marketing planning is viewed as a necessary adaptation to changes in the competitive environment. However, to appropriately establish such changes, it is critical to understand the underlying factors which determine different market response to marketing programs across countries. In the following section, we develop a market response model for each country. Then we discuss factors which are expected to affect marketing mix effectiveness -more specifically price and distribution- across countries. Finally, we present the empirical analysis, concluding with a discussion of the results.

### **A VARYING PARAMETER MODEL FOR EXPLAINING INTERNATIONAL DIFFERENCES IN MARKETING MIX EFFECTIVENESS**

In order to simplify the analysis framework, our focus will be on the marketing of products in the maturity stage of the product life cycle, avoiding the issue of the diffusion process for new products and new brands. This does not limit the applicability of our approach, since such phenomena can be considered by extending the model proposed below. The market response of concern, therefore, is the share of the market of a company or brand in each of the markets where it operates. For a given product category in a country  $c$ , the

market share of a brand  $i$  is determined by the marketing mix decisions of that brand, as well as those of its competitors. Market share models have been used successfully to analyze the market share impact of marketing instruments (Cooper and Nakanishi 1988). An advantage of models such as the attraction model for cross-country comparisons is that the parameters, or response coefficients, can be specified as country characteristics, even though the actual elasticities of the brands to the instruments will also vary due to differences in current market share positions of the brands considered.

The general expression of the Multiplicative Competitive Interaction (MCI) attraction model of market share is represented in Equation (1):

$$MS_{it}(c) = \frac{e^{\delta_i(c)} \prod_{k=1}^K x_{ikt}(c)^{\beta_k(c)}}{\sum_{j=1}^{N_t(c)} e^{\delta_j(c)} \prod_{k=1}^K x_{jkt}(c)^{\beta_k(c)}} \quad (1)$$

where:

- $MS_{it}(c)$  = Market share of brand  $i$  at period  $t$  in country  $c$ ,
- $\delta_i(c)$  = Goodwill of brand  $i$  in country  $c$ ,
- $x_{ikt}(c)$  = Marketing mix variable  $k$  for brand  $i$  at period  $t$  in country  $c$ ,
- $\beta_k(c)$  = Sensitivity of market share to marketing mix instrument  $k$  in country  $c$ ,
- $K$  = Number of marketing mix instruments,
- $N_t(c)$  = Number of brands in country  $c$  at period  $t$ .

In the equation above, the market share of each firm within a country depends on the marketing mix variables of all the competitors in that country. Cooper and Nakanishi (1988) discuss in details this model specification and its implications.<sup>1</sup> They also examine its relationships with individual level choice probabilities. A major advantage of the attraction model is that it is logically consistent, as market share is constrained to have a value between

zero and one and the market shares of all the brands in a country sum to one. Moreover, the elasticities of different brands within a country are not assumed identical, as they depend on the market share that the brand currently owns (brand  $i$  elasticity with an MCI model specification is  $\beta_k(1-MS_i)$ , so that the elasticity depends on the response parameter of marketing mix variable  $k$ , as well as on all the variables and parameters in the model, via  $MS_i$ ). Each country, however has a set of potentially different parameters  $\beta_k(c)$  corresponding to different sensitivities of market share to the marketing mix instruments across countries. A brand may also enjoy different goodwill  $\delta_j(c)$  across the countries in which it is available. This is a measure of the brand equity in country  $c$ , which represents the intrinsic value of the brand in that country, after controlling for marketing mix effort.

The objective of this research is to test if the market share model parameters are significantly different across countries and to attempt to explain why these parameters might be different in the context of one mature consumer-product market. The next section discusses the factors which have been advanced in the literature to argue for different marketing strategies across countries, based on the notion that the corresponding elasticities differ across countries (although the link to elasticity is not always explicit).

## **FACTORS EXPECTED TO AFFECT THE MARKET SHARE IMPACT OF MARKETING MIX VARIABLES**

The factors expected to influence the effectiveness of marketing variables correspond to the reasons which have been advanced for the inappropriateness of standardizing marketing programs. These reasons have been classified as either internal constraints or external constraints (Douglas and Wind 1987). Internal constraints are defined as those which are internal to the organization, such as existing methods of operation in the multinational

company or differences in local management motivations and attitudes. We will focus our research, however, on the external constraints which affect all organizations (especially competitors) operating in a particular environment, and especially on the economic environment, the marketing infrastructure and the market structure.<sup>2</sup> We now discuss the main determinants of market share for the specific market analyzed in this study: price and distribution coverage.<sup>3</sup>

### *Price Response Differences Across Countries*

Three basic explanations for differences in price sensitivity across countries can be found in the literature: differences in competition, differences in marketing infrastructure and differences in levels of economic development.

Competition The nature of competition is a significant predictor of the effectiveness of marketing mix variables (Gatignon 1984, Gatignon and Hanssens 1987). Differences in the structure of competition are often mentioned as an argument against standardization of marketing programs (Rutenberg 1982, Hill and Still 1984). Therefore, we expect that the structure of competition will be a strong predictor of the effectiveness of marketing variables. Competition increases the number of brands available to consumers, who then are more likely to make more brand comparisons. Consequently, the price attribute becomes more salient and consumers become more price sensitive (Gatignon 1984). This explanation supports a positive relationship between the number of competitors and price sensitivity, as well as between competitors' behaviors in the market and price elasticity. The number of brands or concentration ratios are typical measures of the structure of competition in a market. Therefore, we would expect that *the higher the concentration of brands in a country, the less sensitive to price the demand in this market is. Competitive* behavior is difficult to measure directly unless the reaction functions can be established and estimated. In trying to

explain differences in price elasticity across brands, Bolton (1989) considered the variability in prices as a measure of price competition, as well as the extent of category couponing.

Although these variables were not significant in predicting price elasticities, her study only covered U.S. data. A consequence of strong competitive rivalry is lower average prices.

Therefore, we expect that *the lower the average price in a product category in a country, the greater the sensitivity to price* in that country. It should be pointed out, however, that the relationship is purely presented as correlational because there could be ambiguity as to the causality. Indeed, while low average prices can cause greater price sensitivity due to intense competition, low prices could be the result of a highly price sensitive market.

Marketing infrastructure. Marketing infrastructure is not identical across countries.

Indeed, the availability and effectiveness of advertising media differ across countries (Killough 1978, Dunn 1966). For example commercial (private) television is not common to the same degree across countries (Clemens 1987). The number of TV stations, programming length, the scheduling of advertising (ie., no cut versus cut in programming, one cut versus multiple cuts), and the length of advertising flights, all of which vary across countries, can explain differences in the effectiveness of advertising expenditures. Similarly, channels of distribution are not developed in the same way in all countries. For example, one manager from a large multinational company suggested to us that distribution coverage elasticity in Spain for his brand could be higher than in other European countries because of the lack of penetration of his product in the food distribution channel. Also, in some markets, efficient channels of distribution, such as large size distributors, are not available. For example, restrictive laws against large-surface retail locations in Belgium have hampered efficient distribution, even to the point of leading some retailers to expand abroad (e.g., the Belgian Food Lion's expansion into the U.S.). In such cases, distribution coverage will be more expensive because of the lack

in economies of scale which could be achieved otherwise.

Competition is facilitated by large-scale distribution, which exposes consumers to multiple brands. Large stores typically carry a larger selection of brands than do small stores. Baden-Fuller and Stopford (1991) show differences in prices between European countries where countries with concentrated distribution enjoyed lower prices than do countries whose distribution is fragmented. These differences may arise because *large scale distribution itself leads to greater price sensitivity*. Consumers might respond by making more comparisons and becoming more attentive to differences among brands. They may also come to expect price differentials and to search for them. Eventually, therefore, price sensitivity increases. This is further *reinforced by the extent to which private brands, which tend to be less expensive, are common in a country*.

Advertising has been hypothesized to influence price sensitivity in the economics and marketing literatures. Past research has supported two conflicting theories. The market power theory argues that advertising enables a brand to build and reinforce loyalty by differentiating the brand against its competitors and that the end effect is to make consumers less price sensitive (Ornstein 1977, Comanor and Wilson 1979). The advertising-as-information theory suggests that by providing more information to the consumers, advertising increases consumers<sup>1</sup> sensitivity to price (Nelson 1974, 1975). For advertising to interact with price, firms operating in a country must have the possibility to advertise. Consequently, countries which have more mass media available to the consumers should also have higher levels of advertising, and different levels of price elasticities across countries should follow. Therefore, *price sensitivity of demand in a country may be positive & related to the availability of mass communication media according to the advertising-as-information theory (and may be negatively related according to the market power theory)*. This issue

has yet to be resolved; we test for the effect, if any, of availability of media upon price sensitivity.

Level of Economic Development. In more developed economies, consumers are often thought to be less price conscious simply because of their higher incomes (Robertson, Zielinski and Ward 1984). However, the opposite effect could be argued. This is partly due to the fact that more brands are available in more developed countries. This relationship could also follow from the fact that better market infrastructures can be found in developed economies (both distribution and mass market communications). These explanations have been discussed above. After controlling for these explanations, it is possible that *developed economies are still more price sensitive due to a better overall market infrastructure*. This follows the finding that “the poor pay more” due to the greater likelihood to equate price with quality by members of lower social classes, which leads them to buy most costly national brands (Robertson, Zielinski and Ward 1984).

#### *Distribution Coverage Effectiveness Across Countries*

*The three factors discussed above for price sensitivity could also explain differences in distribution coverage sensitivity across countries.*

Marketing: Infrastructure. An increase of distribution coverage can result in a greater gain in market share in one country than in another. This can be simply due to the saturation effect, which would predict that as a country becomes saturated in its distribution availability, the effectiveness of increasing distribution coverage would decrease. Therefore in countries where distribution is extensive, we anticipate that the effectiveness of distribution coverage is smaller than in countries where distribution is not extensive.

The extent to which private labels for the product category are used in a country

should also be related to the distribution coverage elasticity. In some countries, private labels are used heavily (that is, they collectively account for a high share of consumer sales). As private labels tend to be used by large stores, gaining distribution in such markets is especially difficult. The large stores will grant substantial (and often preferential) shelf space to their own brands, obliging other competitors to fight for the limited space remaining. Battling private label brands in their own stores will prove challenging. To increase their distribution, firms will be obliged to court stores without their own brands--that is, the smaller stores, which, in a market dominated by private labels and their associated stores, will be less favored by consumers. In short, the greater the extent of private labels, the more firms will realize distribution increases disproportionately in smaller stores. Hence, we expect that *the higher the market share of private labels, the lower the effectiveness of distribution coverage.*

Finally, the availability of mass media communications can interact with distribution coverage in predicting market share. In countries where mass communications are widely available, consumers are exposed to more advertisements. This greater exposure to advertising, in turn, sensitizes consumers to brands and raises their interest in trying different brands. Greater exposure to advertising also reduces traditional fear of the possibly negative consequences of trying a new brand. In short, more advertising in a society per se increases the propensity in that society to notice and to try brands, and this is not a product-specific effect. *Distribution should be more effective when mass communications are widely available than when they are rare.* This is because when a brand appears in a new outlet (greater distribution coverage), the consumer is less likely to notice the addition and less likely to try the new offering in a society in which little advertising (in an overall sense) occurs. In short, overall advertising in a society helps manufacturers capitalize on their increases in distribution coverage, which translates into larger market share. Although we are not aware

of any prior research about this specific relationship, this is consistent with the interaction between advertising and distribution discussed in the context of advertising field study experiments by Farris and Reibstein (1984).

Competition. Competition, especially rivalry, increases brand comparison by consumers. Hence, marketing mix variables lose their effectiveness in terms of convincing consumers to choose a particular brand (with the exception of price, which becomes more salient (Gatignon 1984)). Therefore, comparing a country with strong competition to a country with little competition, it takes more marketing effort to obtain the same market share in the former case than in the latter. This phenomenon is represented with smaller elasticities of the marketing mix variables. Consequently, countries *which are more competitive* (using brand concentration as a measure of the competitive structure and average price as a measure of competitive behavior, as discussed below), *should show a smaller effectiveness of distribution coverage increases.*

Level of Economic Development. While the level of economic development could be logically related to the effectiveness of distribution coverage, this factor is often used as an amalgam of potential explanations (Keegan 1989). These explanations are mostly those represented by the factors discussed above. The issue is, therefore, to assess whether the level of economic development can explain differences in distribution sensitivity tier controlling for all the other factors mentioned above, ie., beyond the effect of marketing infrastructure and competition.

## ANALYSIS

Data

Finding suitable data to carry out the analysis reported here has been much more

difficult than we expected. It could well be that international market research has not reached the point where studies such as this one can be conducted routinely. The analysis requires complex data involving (1) time-series of cross-sections, ie., competitive information on market share and marketing mixvariables over time and (2) data relating to country infrastructure. Hanssens, Parsons and Schultz (1990) mention the difficulty of choosing the appropriate data base because of the lack of data availability, especially for cross-sectional studies in marketing where competitive considerations prevent the information for all firms in an industry to be obtained. Furthermore, when this same type of information is needed for multiple countries, the problems of missing data are multiplied. Douglas and Craig (1983) discuss the problems of lack of secondary data in general for some countries and the problems of comparability and equivalence across countries when available. Different issues were raised for competitive market data and for general country characteristics. Although industry characteristics are obtained as part of the competitive market data, they vary by country and are, therefore, discussed separately.

*Competitive market data.* The lack of comparable market share information was confounded by the lack of competitive marketing mix information, except in just a few countries. A multinational manufacturer decided to start acquiring this information throughout Europe on a standardized basis<sup>4</sup> While this permitted to collect relatively similar data across countries, this delayed the research project. Even then, both the multinational manufacturer and the multinational syndicated research firm which provided and collected the data, encountered substantial problems in reaching the point where a usable multinational data base was available. The data requirements are such that they must be standardized internationally (or at least over a region covering multiple countries). Similar products must be available in all the countries analyzed in order to compare the same things across countries.

If the products were not standardized, it would be necessary to account for differences in consumer preferences which is a difficult task, often determined judgmentally by managers (Lambin 1976). The market share measures should be comparable, as well as the measures of the marketing mix variables so that their effectiveness can be compared. The data must be available in a sufficient number of countries in order to gain degrees of freedom, to have enough variability in the data, and to be able to compare the effectiveness of the same marketing instrument across countries. A sufficient number of observations (time periods) is necessary to estimate the models accurately.

The identity of the product category used to illustrate our approach has been disguised, at the request of the company which provided the data. It is a mature branded product in all the markets studied, a frequently purchased consumer nondurable, widely available and distributed in all markets of the world and quite competitive. The choice of a mature product is motivated by the requirement of a standardized product, as discussed above. However, because the market is very competitive, marketing mix activities and market shares are not stable. The data are as follows:

(1) market share data in the mass retail market for two variants of the product in thirteen European countries over seven bimonthly time periods for all brands (including private labels) marketing through such mass channels of distribution. The market shares are based on store scanner sales data which are aggregated.<sup>5</sup> The time period covers 1992 and 1993 data. The two product variants correspond to two levels of quality of the product. One is a high quality product and the other performs less well than the high quality one. There is no product differentiation among the competing low quality brands, and some (but small) differentiation among the high quality brands. Private brands are available in all markets, although to a different degree, but never had a dominant market share relative to branded products.

(2) marketing mix activities fix the product during the same time period for each brand and country. Data for the two major marketing activities could be obtained in a standardized way and across all thirteen countries; these are retail prices (computed from sales volume and revenues) and distribution coverage weighted by product class volume (PCV) (Farris, Olver and De Kluyver 1989). While other instruments might generally influence market share, management considers that these two variables explain a large part of market performance. For example, advertising is not a significant factor contributing to market share in this case, probably due to the maturity of the product. This assessment was supported by preliminary analysis of market share models for Belgium, where more complete data were available. Table 1 summarizes the differences in the pricing and distribution coverage across brands and across countries. While the variance across brands appears typical, the variation across countries is striking. For example, the same brand can cost four times more in one country than in another one. A brand widely distributed in one country can have a small distribution in another country.

*General Country Characteristics.* Data series on a number of aspects of market structure, marketing infrastructure, economic situation, and socio-cultural conditions for each of the thirteen countries under study are necessary to explain differences that may occur across countries. Again, it must be emphasized how difficult it still is to collect such information in a standardized way across more than a few countries (Douglas and Craig 1983). If one looks for more than the standard socio-economic-demographic indicators collected and published by the international institutions (IME, World Bank, United Nations, etc.) and focuses on social indicators and on marketing indicators, it is seldom possible to find series which are standardized and available over a sufficient number of countries and/or time periods. This is a major obstacle to overcome if progress in multinational marketing is to be achieved. Euromonitor reports the broadest range of variables of this nature (Douglas and Craig 1983).

The country characteristics for which secondary data were obtained correspond to the

factors expected to influence the marketing mix sensitivities. Macroeconomic variables such as GNP, the age of the population (specifically, the percentage of men aged under 15), and the combined circulation of mainstream consumer publications are considered to be measuring the degree of economic development of a country. The distribution infrastructure is represented by measures such as the number of retail outlets in the country (relative to the population size), as well as by the proportion of retail outlets which are hypermarkets or superstores. The communication infrastructure in a country can be assessed by the number of television receivers, the number of national newspapers, the circulation of daily national newspapers, the number of mainstream consumer publications, and the number of main line telephones, all on a per capita basis. The last variable represents the potential for interpersonal communication, while the other variables concern the availability of mass media. A distinction was made between the number and the circulation of mainstream consumer publications because, as confirmed by a factor analysis discussed below, the number of consumer publications is an indicator of the availability of media, while the circulation represents the extent to which these publications cover the population in the country. Therefore, circulation of consumer publications was thought to be related to the amount of consumer information desired by consumers in a country, which is related to the level of economic development. The circulation of daily national newspapers was considered an indicator of communication infrastructure (rather than economic development) because daily national newspaper coverage does not have the same significance as consumer publications as far as the level of economic development is concerned. It should be noted that these characteristics are conceptually defined at the country level; the media availability variables represent the population's ability to receive information, possibly their desire for such information and the potential for advertisers, but it does not indicate that for specific products, advertising might be effective.

In fact, as indicated earlier, advertising is not significant for the product studied.

*Industry characteristics.* Industry characteristics were computed from the store audit data. Industry concentration was measured by the average concentration ratio of the largest two competitors in the country (CR2)<sup>6</sup>. The price level was computed as the average price charged in a country for the product in ECU (average over time and over brands). The extent of private labels was measured by the average share of private labels for the product over time.

## Analysis

Equation (1) provides the basic market share response function for a given country. The objective of this research is to test whether and to explain why the market share function parameters vary across countries. As indicated earlier, the explanations involve country characteristics as well as industry-level variables. These two levels of analysis are first carried out separately so that each kind of effect can be measured. The first stage of the analysis of country-level variables is to determine the basic and relevant underlying dimensions of country differences based on a number of specific country characteristics. A factor analysis was performed to identify meaningful orthogonal dimensions. The variables submitted to factor analysis concerned the macroeconomic variables, distribution infrastructure variables and communication infrastructure variables presented earlier. All the variables are expressed relative to the population size (per capita).<sup>7</sup> A two-factor solution emerged from the factor analysis, each with eigenvalue larger than one, 5.50 and 2.08 respectively (Table 2). The first factor can be unambiguously interpreted as concerning mass communication intensity/development. The second factor combines the macroeconomic development variables with the distribution intensity measures; a high GNP per capita goes with an older population, greater exposure to mainstream consumer publications<sup>8</sup> and more concentrated

distribution (fewer retail outlets per capita and a larger proportion of hypermarkets and supermarkets). This factor seems to represent a socio-economic maturity index, Even within the European Union, the economic level of the various countries is far from being homogeneous, which has raised concerns over the feasibility of the common currency according to the Maastricht schedule (Nelson 1992). Factor scores were computed from this analysis and used as explanatory variables in the subsequent modeling. Figure 1 shows a graphical representation of the position of fifteen European countries along these two dimensions.

Industry-level variables” correspond conceptually to a different type of explanation of differences in marketing mix sensitivity; they characterize the competitive structure of the industry. An industry concentration measure was used: the CR2 measure was chosen as providing variability across countries. This variability decreases rapidly as more brands are considered in our application, due to the relatively small number of brands (between 3 and 8 major brands in most countries, excluding private labels). Related to the competitive structure, the average price charged in the country for the product was used as a measure of the competitive intensity of the industry in the country. Finally, the type of distribution for the product was assessed by the share owned by private labels for this product.

Therefore, five factors are now used to explain variations in the market share response coefficients across countries: the two factor scores corresponding to mass communication intensity and economic maturity and the three indices related to the specific industry in the country, ie., the concentration ratio, the average price, and the share of private labels. **These five factors are used to explain the marketing sensitivity parameters  $\beta(c)$  shown in Equation (1):**

$$\beta_k(c) = \alpha_{0k} + \alpha_{1k} F_1(c) + \alpha_{2k} F_2(c) + \alpha_{3k} CR2(c) + \alpha_{4k} AvPrice(c) + \alpha_{5k} PrivShare(c) + \epsilon_k(c) \quad (2)$$

where:

- $\beta_k(c)$  = Effectiveness of marketing instrument k in country c
- $F_1(c)$  = Communication factor in country c,
- $F_2(c)$  = Economic maturity factor in country c,
- $CR2(c)$  = Concentration ratio of the largest two brands in country c (average over time),
- $AvPrice(c)$  = Average price across brands and periods in country c,
- $PrivShare(c)$  = Share of private brands in country c (average over periods).

Nakanishi and Cooper (1982) prove that the parameters of the model represented by equation (1) can be estimated using the linear regression model after taking the logarithms of each side of equation (1), with dummy variables for the brands and for the time periods. The parameter estimates are equivalent to those obtained from the estimation method proposed earlier by Nakanishi and Cooper (1974) which uses the log-centering transformation. The parameters in equation (2) are estimated simultaneously with equation (1) using an Estimated Generalized Least Squares procedure which follows Swamy (1970)'s random coefficient model estimation procedure. Appendix A describes the estimator and the estimation procedure. It should be noted that if the coefficients of the five factors in equation (2) are not significant, the model reduces to the random coefficient model (Swamy 1970, Judge *et al.* 1985, Greene 1993).

## Results

Equation (1) was first estimated separately for each country. This first stage of the estimated generalized least squares estimation procedure is also useful to test whether the response (sensitivity) coefficients are the same across countries. The results are reported in

Table 3.<sup>11</sup> In general, the signs and the magnitude of the coefficients are consistent with expectations. Although these parameters are not elasticities which vary by brands depending on their market share, they correspond to the theoretical elasticities of a brand with a zero market share. Consequently, a single parameter is estimated by country and this estimate is reported for price and for distribution coverage. For the low quality product, all the price coefficients are negative and nine are statistically significant at the 0.05 level; the non-significant coefficients are typically found for countries with fewer observations (e.g., Italy). The price coefficients vary from -4.51 to -1.02. Apart from three insignificant coefficients, the distribution coverage coefficients are all positive, varying within a range of 0.32 to 1.27. The results are similar for the high quality product where all the distribution coverage coefficients are statistically significant and vary between 0.20 and 2.38. It is possible that these coefficients are the results not only of the effect of distribution coverage on market share but also of the effect of market share on distribution (Farris, Olver and De Khryver 1989). However, this would suggest a convex relationship which is clearly not supported for the low quality product. This problem is minimized with the time-series observations where distribution is unlikely to react to bi-month variability in market share. For the high quality product, fewer price sensitivity parameters are significant and two countries (Belgium and Portugal) have a positive coefficient. This tends to indicate that price is a less critical factor for the high quality product and that, in some cases, price might be an indicator of the quality of the product, leading to a positive effect of price. Although both coefficients are unitless and can be interpreted as the maximum elasticity of a brand when the market share is zero, one percent change in price is not comparable to a one percent change in distribution coverage. Consequently, the relative magnitudes of the price and the distribution parameter are not comparable, except in the context of the Dorfman-Steiner theorem which states the conditions

that will be satisfied when the optimal values are found (Farley and Lehmann 1994). A Chow Test (Chow 1960) of linear restrictions where all coefficients across countries were constrained to be equal revealed a significant increase in residual sum of squares. The chi squared tests were also significant when the test of equality was performed separately for the price sensitivity and for the distribution coverage effectiveness parameters. Given these significant differences, applying the same marketing mix across countries appears inappropriate. These test results indicate that there are country differences in marketing mix effectiveness. However, in order to guide how the marketing mix decisions should differ across countries, a better understanding of the reasons for these differences in price sensitivity and distribution coverage effectiveness is necessary. The results of the simultaneous estimation of the response and process equations help us shed some light on the correlates of these parameters.

The estimated generalized least squares estimates are shown in Table 4<sup>12</sup>. The parameter estimates represent the impact of the country factors on the price and distribution **coverage parameters respectively, and correspond to the  $\alpha$ 's in Equation (2)**. The expected signs according to the hypotheses presented above are indicated in Table 4. Consistent with the advertising-as-information theory, countries which have more extensive mass **communication networks are more price sensitive for the high quality product ( $\alpha=-2.211$ ,  $t=-4.15$ )**. Also for these products, the more price sensitive countries are those which are more **economically mature ( $\alpha=-1.532$ ,  $t=-2.61$ ), where private labels are more common ( $\alpha=-2.192$ ,  $t=-3.76$ ), and where the average price is lower ( $\alpha=3.141$ ,  $t=2.89$ )**. This indicates that consumers in countries which are more economically mature, which have extensive mass communication, or where competition is more intense pay more attention to price and pay less for their purchases of that product category.

Distribution coverage is found to be more effective in generating market share of the low quality products in countries which have more extensive communication networks ( $\beta=0.315$ ,  $t=3.10$ ). This indirectly supports the positive interaction between advertising and distribution. The results also indicate that the distribution of the low quality product is more **effective in countries which are more economically mature** ( $\alpha=0.206$ ,  $t=1.785$ ), but the distribution of the high quality product is more effective in countries which are less **economically mature** ( $\alpha=-0.52$ ,  $t=-4.44$ ).

Although not part of the conceptual discussion above, some differences in the patterns of market share response coefficients across the two products are noticeable. As alluded to earlier, the market share of the low quality product tends to be more elastic to price than is the market share of the high quality product (in seven countries, as can be seen in Table 3). Low quality products being more of a commodity with less product differentiation, consumer choice is mainly based on price, which explains why the price elasticity would be higher for low quality than for high quality products.

The distribution coverage parameter is larger for the high quality product than for the low quality product in ten out of the thirteen countries (Table 3). A possible explanation for this pattern is that distribution is more critical for high quality products in order to make the product more salient to the consumers. The product category we examine is a necessity. As noted earlier, the low-quality segment bases its purchase heavily on price. Consumers are likely to search (within and across stores) to find a stock of this low-priced good. Hence, retail availability and more shelf space (high distribution coverage) are not as important to sell the low-quality brands.

These results regarding the moderating role of product quality are exploratory and are not specifically concerned with the international issue addressed in this study; nevertheless,

they may suggest interesting avenues for further international research, due to the ability to replicate these results in multiple countries; which enhances the confidence in findings concerning general marketing principles.

## CONCLUSION

To our knowledge, this is the first study to consider the international heterogeneity of market response in a systematic fashion. At a time when this type of data is becoming more readily available in a standardized fashion across countries, this study demonstrates that a systematic and structured analysis of such data provides useful information concerning the transferability of marketing mix budget allocations across countries. This research contributes to understanding of differences in marketing effectiveness in different countries and by the same token should enable multinational management to take advantage of similarities or differences among countries in an optimal manner.

Empirical generalizations are the cumulative result of multiple studies (Bass 1993). We provide in this single study a replication of the estimation of a market share model in multiple countries. But part of the generalization process is also to learn from these multiple studies about different patterns in order to identify contingencies and moderating explanations of differences. For example, Kaul and Wittink (1995) find that a pattern emerges from a number of studies of the impact of advertising on consumers' price sensitivity: differential effects are stated for non-price and price advertising.

Our study provides also a number of observations across countries concerning the generalization about the relationship between distribution coverage and market share. Farris,

Olver and De Kluyver (1989) and Reibstein and Farris (1995) argue that the relationship is convex because of the structure of retail distribution and because of the two-way causality between share and distribution. For cross-sectional data, the generalization appears strongly supported (Reibstein and Farris 1995). However, the theoretical explanation for a convex relationship with time-series data is not as clear. Nuttall (1965) argues for a diminishing effect for a given brand and Reibstein and Farris (1995) offer a set of explanations for a concave relationship: (1) when markets are segmented by outlet type, (2) when all outlets stock about the same number of brands, (3) decreasing marginal in-store support at high levels of distribution. They recognize that attraction models would imply a concave relationship. However only two studies were available and do not appear to correspond to the conditions described above. Our study concerns data where the first two conditions are met because, by definition, only mass distribution channels were considered. This minimizes the issue that small outlets would be more selective in choosing to carry only the brands with high market share because all outlets considered are large. Furthermore, our study analyses time-series of cross-sectional data and part of the cross-sectional effects are picked up by the brand specific goodwill factor. Consequently, these results are relatively unique evidence as to the relationship between distribution and market share. A concave relationship is found in twelve out of thirteen cases for the low quality product and in six out of thirteen countries for the high quality product. This evidence demonstrates the difficulty of making empirical generalizations, but suggests that the convex relationship speculated by Reibstein and Farris (1995) for time-series data might not be universal; our data tend to support the possibility of the concave theories in some circumstances.

Our results are limited in scope due to the fact that only European countries are considered and that only one product is considered. Generalizability of such results can only

be obtained by considering a greater number of products. Because different products would present different responses to the marketing mix variables (different response coefficients), this first study deliberately controls for this by considering a standardized product across countries. However, future research should attempt to generalize the role of the country characteristics investigated in this research to other marketing mix variables, especially to advertising. While advertising is not a significant marketing instrument in the market considered here, most of the literature about marketing standardization has been concerned with advertising. Therefore, it is important for future research to use the same methodology to analyze differences in advertising elasticities across countries.

In spite of these restrictions, a number of conclusions can be reached from this study. Differences in marketing mix sensitivities are a strong barrier to standard allocation of marketing resources to price, distribution, etc. in Europe. This confirms the study of the washing machine market in Europe by Baden-Fuller and Stopford (1991). It is noteworthy that these conclusions are similar *even though the product we consider is a low involvement nondurable*. The results support the hypothesis that the sensitivity of market share to marketing mix variables is strongly related to general economic maturity, even for an inexpensive frequently purchased consumer good. This has direct consequences for the segmentation scheme to be used in international marketing. Segmentation based on the level of economic development of countries is validated by these results. Furthermore, the findings in this study indicate that the equalizing of economic maturity within the European Union could lead to a standardization of marketing strategies. This suggests that the benefits of standardization could only be realized after the economic development levels of the EU countries become more similar. Consequently, policies directed at equalizing these levels of economic development should be received favorably by firms intending to benefit from

standardized marketing strategies across the European Union.

This study has proposed a methodology to rationally examine the issue of the similarities and differences in marketing mix elasticities across countries. While this study does not encompass all the complexities of the issue of transferability of marketing programs across countries, we offer a structured modeling approach to study the problem in a systematic manner. We have demonstrated that such analyses are critical to answering the marketing program standardization question. The implications are also shown to be critical for the further development of economic regions to benefit more from standardization within these regions.

In an overall substantive sense, these results suggest that it is difficult to justify using the same marketing mix allocation across multiple markets. The product examined here epitomizes low involvement; it is an extremely utilitarian, inexpensive, frequently purchased supply item in any household. It would be difficult to imagine any cultural overtones to this product category, and it is difficult to differentiate a brand. This is why private labels exist, price is important and marketing mix variables other than price and distribution are ineffective. Yet, even in such a routine product category, differences in marketing mix responsiveness are large enough to suggest that standardized marketing is inappropriate. Differences in demand are such, even for a low-involvement commodity, that the cost savings of standardization would be unlikely to exceed the opportunity cost of failing to tailor the marketing mix to the market. If standardization is difficult to justify, even for a particularly routine frequently purchased consumer supply item with no cultural overtones, it is difficult to imagine the product for which standardized marketing *is* appropriate. Hence, we suggest that the usual answer to the question about whether the allocation of resources to the marketing mix can be the same internationally is no.<sup>13</sup> Our study demonstrates empirically the barrier due to

differences in the level of economic development, even when dealing with industrialized countries. While this factor has long been recognized as an important consideration for international marketing, we show that it is a strong determinant of the effectiveness of two marketing activities, price and distribution coverage.

## ENDNOTES

1. While, in theory, the MCI attraction specification requires that all the determinants of attraction are strictly positive, Cooper and Nakanishi (1988) discuss how the zeta transformation can be applied for interval scaled variables. In our study, price and distribution are always strictly positive.
2. Characteristics of firms in a market which are shared within a country are considered as market characteristics representing external constraints. Other characteristics which are idiosyncratic to firms should be independent of external constraints and focusing only on the later group of variables should not bias the results.
3. Advertising, according to the management of the firm which supplied the data, is not a significant factor, as seems to be confirmed by the high  $R^2$  obtained in our results and by preliminary analysis performed on Belgian data.
4. A number of European market research firms have now started to provide access to key market statistics for a wide range of packaged goods on a comparable basis (Marketing News, 1994).
5. Shoemaker and Pringle (1980) and Cooper and Nakanishi (1988) discuss the advantages and limitations of different types of data. Store scanner data provide sales data for each aggregated period in units and in value. Market shares are computed based on the sales volume. The scanner technology has been widespread only recently in a number of European countries analyzed in this study. Consequently, it was not possible to retrieve similar data prior to 1992. In fact, this study was a major incentive to gather standardized marketing data across European countries using state-of-the-art methodologies.
6. Other concentration ratios were computed. However, the CR2 measure provided the most information (the largest variance) across countries.
7. Defining the variable on a per capita basis represents the intensity of these variables in the population. Although the absolute numbers are conceptually related to the constructs as well, all the raw variables would load on a single factor representing the size of the country, which is not a useful construct to analyze marketing mix sensitivity differences across countries. Consequently, the per capita definition of the variables was used.
8. Although the circulation of mainstream consumer publications is also related to the first factor, there is a difference of interpretation between the number and the circulation of publications. The number of publications per capita relates to the variety of publications available to consumers in a country while the circulation per capita concerns the extent to which these publications cover the population. It is possible that multiple consumer publications exist in a country, but that its readership is limited to a small elite; the number of publications can then be high and the circulation per capita would be small. Consequently, these two variables were used in the formation of the factors.

9. Multiple-item scales were also developed for these two factors using the items loading on each respective factor. The coefficient alpha's were 0.91 and 0.85 respectively and substituting the factor scores with these scales resulted in similar results.

10. These industry-level variables were not factor analyzed with the country characteristics because they concern different conceptual explanations which have each a specific impact to be estimated.

11. The number of observations (N) in each country varies because the number of brands available differs by country. R<sup>2</sup>s are typically high because of the presence of dummy variables fix brand specific and time specific constants which reduce the degrees of freedom (Cooper and Nakanishi 1988).

**12. None of the correlation between these variables were significant at  $\alpha=0.01$ .** Although the correlations between the communication factor, average price and the concentration ratio were in the range of 0.56-0.64 (significant at the 0.05 level), sensitivity analyses were performed by deleting the correlated variables and the results remained unchanged. Consequently, the results of the fully specified model are reported below.

13. This implication applies at least for the marketing activities and the countries analyzed in this study. Firms might be able to transfer product positioning and overall advertising themes.

Table 1 - Range of Price and Distribution Coverage By Country and By Brand

LOW QUALITY PRODUCT

Price (In E.C.U.)

Brand	AUSTRIA	BELGIUM	DENMARK	FINLAND	FRANCE	ITALY	NETHERLANDS	NORWAY	PORTUGAL	SPAIN	SWEDEN	UK	W.GERMANY
1	1.28-1.80	1.89-1.91					0.81-1.01		0.81-1.03				1.78-1.95
2						2.42-2.43							
3												1.83-1.99	
4			1.92-2.02	1.53-1.88				2.80-2.74			1.45-2.82		
5		1.28-2.35			1.43-1.85	1.37-1.40				0.83-0.78			
6		1.47-1.89	1.45-1.58		0.84-0.92	0.93-1.02				0.58-1.02	1.87-2.05	1.58-1.78	1.13-1.47
7	1.28-1.44	1.63-1.69	1.60-1.75	1.11-1.30	0.98-1.38	1.04-1.18	1.78-1.87	2.19-2.39	0.73-0.78	0.50-0.78	1.54-1.85	1.30-1.58	1.30-1.34
8	1.28-1.44	1.89-2.29	1.94-2.92		1.32-2.00		1.80-1.79	2.38-2.90		0.82-0.83			1.39-1.47
9	1.28-1.80	1.31-1.53	0.88-0.70	1.28-1.49	0.88-1.12	1.08-1.10	1.58-1.87	2.99-4.32	0.88-0.77	0.82-0.84	1.45-1.70	1.53-2.22	1.87-1.94
10		1.28-1.58	0.75-0.87		1.28-1.62				0.62-1.25				1.58-1.59
11									0.73-0.80	0.79-0.81			
12													
13						1.47-1.52			0.67-0.70	0.68-0.68			

Distribution Coverage

Brand	AUSTRIA	BELGIUM	DENMARK	FINLAND	FRANCE	ITALY	NETHERLANDS	NORWAY	PORTUGAL	SPAIN	SWEDEN	UK	W.GERMANY
1	7-12	3-5					16-20		37-49				17-23
2						5-8							
3													
4			81-88	38-41				55-82			1-4	40-47	
5		1-17			59-84	38-41				1-2			
6		2-8	1-2		1-8	2-2	20-30	14-27	1-2	1-4	1-4	3-4	1-1
7	34-43	61-89	15-19	37-45	9-14	34-36	83-88	12-21	25-41	15-21	48-54	3-14	14-23
8	20-25	2-5	1-3		2-12			12-22		19-28			45-62
9	71-78	6-17	6-9	45-53	25-32	6-8	3-5	2-16	8-12	1-9	9-15	21-27	41-48
10		78-87	2-4		24-42				2-6				14-19
11									14-19	87-70			
12						78-82							
13									83-90	55-60			

HIGH QUALITY PRODUCT

Price (In E.C.U.)

Brand	AUSTRIA	BELGIUM	DENMARK	FINLAND	FRANCE	ITALY	NETHERLANDS	NORWAY	PORTUGAL	SPAIN	SWEDEN	UK	W.GERMANY
1	3.04-3.38	3.06-3.22	3.39-3.65	3.15-3.38	2.80-2.88	2.74-2.77	2.47-2.88	3.28-3.78	1.51-1.89				1.95-2.02
2									1.78-2.12	2.50-2.71	2.78-2.80	2.82-3.22	2.80-2.83
3												2.98-3.22	
4			2.90-2.92	1.72-2.88				2.08-3.83					
5		2.79-3.44			2.24-2.52	2.39-2.42							
6	2.72-4.98	2.08-2.35	2.90-3.28		1.80-2.89	1.74-1.81	2.33-2.53	2.80-4.70		2.02-2.27			
7	1.80-2.08	2.57-2.89	2.85-3.13	1.99-2.33	1.78-2.07	2.38-2.38	2.05-2.25	2.87-4.02	1.30-1.48	2.37-3.02	2.23-3.07	2.49-3.09	1.18-1.18
8	2.24-2.58	2.79-2.89	2.82-3.54	2.38-2.68	2.35-2.74	2.28-2.33	1.83-2.53	3.07-3.50	1.43-1.71	1.58-1.99	2.14-2.41	1.26-2.32	2.24-2.27
9	2.08-2.24	2.40-2.88		2.12-2.45	2.18-2.51	2.29-2.30	1.80-1.88	3.41-6.13	1.41-1.74	1.86-2.42	2.16-2.80	1.89-2.03	2.15-2.38
10		2.48-2.84	1.11-1.24		2.28-2.55					1.54-2.38	2.80-2.94	2.16-2.89	2.37-2.80
11													1.88-2.15
12						2.25-2.27			1.84-2.08	2.13-2.30			
13									1.42-1.47	1.89-2.03			

Distribution Coverage

Brand	AUSTRIA	BELGIUM	DENMARK	FINLAND	FRANCE	ITALY	NETHERLANDS	NORWAY	PORTUGAL	SPAIN	SWEDEN	UK	W.GERMANY
1	48-74	83-85	82-88	58-61	88-100	92-93	86-90	77-93	14-28	49-67	62-72	75-82	15-18
2									55-67			34-43	25-29
3													
4			55-73	10-19									
5		12-25			62-89	49-52		1-2					
6	1-2	5-10	1-1		1-4	1-1	12-14			1-1			
7	30-39	67-72	8-13	17-29	17-23	38-42	45-51	4-13		2-5	1-3	1-2	1-1
8	25-33	40-65	6-12	25-34	50-88	30-31	4-5	5-17	22-41	14-21	48-51	13-19	10-19
9	83-72	6-9	40-50	40-50	24-34	8-10	2-4	11-19	6-11	41-52	1-4	1-9	45-61
10		61-70	3-8		29-45			3-4	5-13	1-21	9-14	9-14	40-48
11													16-20
12						48-53			5-9	47-49			
13									48-65	47-50			

**Table 2 - Factor Analysis of Country Characteristics**

	<b>FACTOR 1</b>	<b>FACTOR 2</b>
Number of TV receivers per capita	<b>.904</b>	.205
Number of telephone lines per capita	<b>.875</b>	.194
Outdoor advertising expenditures	<b>.605</b>	.335
Number of national newspapers per capita	<b>.843</b>	-.005
Circulation of daily national newspapers per capita	<b>.744</b>	.271
Number of consumer main stream publications per capita	<b>.881</b>	.059
GNP at market prices	.274	<b>.816</b>
Percentage men aged above 15	-.100	<b>.802</b>
Combined circulation of mainstream consumer publications per capita	.531	<b>.565</b>
Number of retail outlets per capita	-.239	<b>-.789</b>
Proportion of hypermarkets & superstores	.180	<b>.785</b>

**Table 3 - Market Share Equation Parameter Estimates  
(Ordinary Least Squares Estimation Separately for Each Country)\***

**LOW QUALITY PRODUCT:**

Countries	Price	Distribution Coverage	N	Adj R <sup>2</sup>
Austria	-1.02 (-2.76) <sup>a</sup>	0.98 (5.00) <sup>a</sup>	28	.995
Belgium	-1.45 (-2.86) <sup>a</sup>	0.54 (6.75) <sup>a</sup>	49	.986
Denmark	-1.23 (-1.65) <sup>b</sup>	0.74 (3.58) <sup>a</sup>	40	.987
Finland	-0.74 (-0.96)	0.98 (2.24) <sup>a</sup>	21	.901
France	-1.41 (-1.82) <sup>b</sup>	0.79 (4.70) <sup>a</sup>	39	.961
Italy	-0.78 (-0.29)	0.65 (0.66)	12	.975
Netherlands	-0.10 (-0.18)	0.43 (2.06) <sup>a</sup>	28	.991
Norway	-4.51 (-6.03) <sup>a</sup>	1.27 (7.33) <sup>a</sup>	35	.977
Portugal	-2.17 (-3.10) <sup>a</sup>	-0.01 (-0.02)	47	.944
Spain	-1.29 (-1.84) <sup>b</sup>	0.32 (3.79) <sup>a</sup>	36	.945
Sweden	-0.18 (-0.25)	0.30 (1.73) <sup>b</sup>	26	.985
United Kingdom	-1.39 (-3.71) <sup>a</sup>	0.05 (0.79)	28	.985
West Germany	-3.96 (-6.31) <sup>a</sup>	0.60 (2.48) <sup>a</sup>	18	.994

**HIGH QUALITY PRODUCT:**

Countries	Price	Distribution Coverage	N	Adj R <sup>2</sup>
Austria	-2.22 (-6.20) <sup>a</sup>	0.26 (5.07) <sup>a</sup>	30	.995
Belgium	2.31 (2.54) <sup>a</sup>	0.77 (4.55) <sup>a</sup>	49	.979
Denmark	-1.97 (-0.98)	1.81 (3.75) <sup>a</sup>	38	.890
Finland	-1.78 (-3.17) <sup>a</sup>	1.07 (4.21) <sup>a</sup>	35	.953
France	-4.58 (-6.30) <sup>a</sup>	1.03 (4.76) <sup>a</sup>	49	.959
Italy	2.31 (0.85)	0.78 (1.49) <sup>a</sup>	14	.998
Netherlands	0.25 (0.76)	1.78 (4.23) <sup>a</sup>	35	.982
Norway	-0.62 (-1.20)	1.26 (4.91) <sup>a</sup>	41	.936
Portugal	3.17 (1.92) <sup>b</sup>	2.38 (6.22) <sup>a</sup>	47	.927
Spain	-0.83 (-0.95)	0.87 (4.45) <sup>a</sup>	43	.948
Sweden	1.93 (0.95)	0.43 (2.53) <sup>a</sup>	34	.858
United Kingdom	-0.16 (-0.50)	0.20 (2.08) <sup>a</sup>	41	.993
West Germany	-1.93 (-0.98)	1.09 (2.42) <sup>a</sup>	20	.977

\* Coefficients of dummy variables are not reported; t-statistics in parentheses.

<sup>a</sup> Statistically significant at  $\alpha = .01$

<sup>b</sup> Statistically significant at  $\alpha = .05$

**Table 4 - Estimated Generalized Least Squares Estimates\***

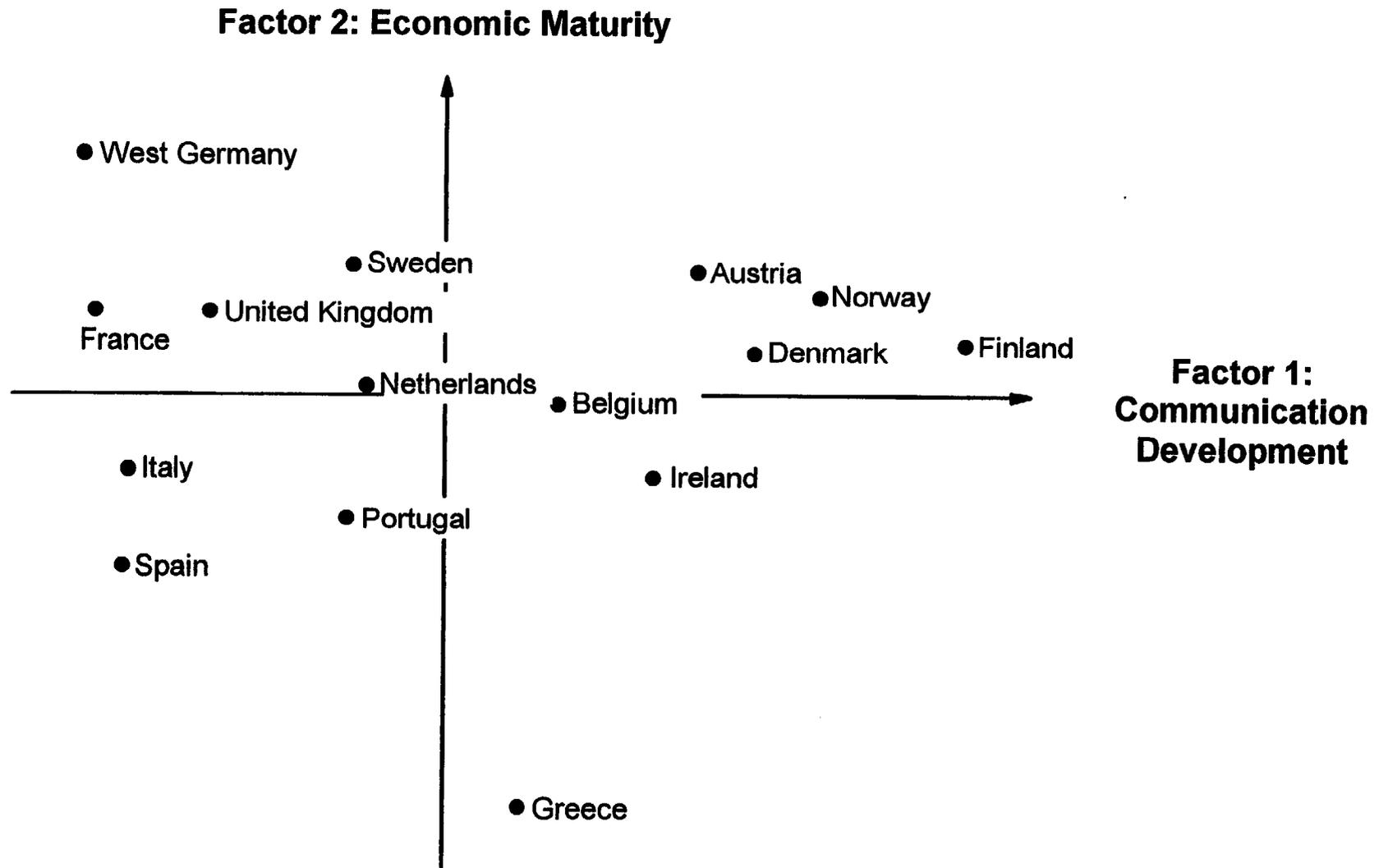
	Expected Sign of Coefficient	Low Quality Product	High Quality Product
<b>Price Sensitivity:</b>			
Constant		-1.448 (-0.851)	-2.183 (-0.869)
Communications	+/-	0.132 ( 0.384)	-2.211 (-4.151) <sup>a</sup>
Economic Maturity	-	-0.301 (-0.635)	-1.532 (-2.612) <sup>a</sup>
CR2	+	0.018 ( 0.959)	-0.065 (-1.377)
AvPrice	+	-0.906 (-1.107)	3.141 ( 2.889) <sup>a</sup>
PrivShare	-	1.897 ( 1.015)	-2.192 (-3.759) <sup>a</sup>
<b>Distribution Coverage Effectiveness:</b>			
Constant		1.150 ( 2.683) <sup>a</sup>	0.293 ( 0.504)
Communications	+	0.315 ( 3.103) <sup>a</sup>	0.011 ( 0.087)
Economic Maturity	+/-	0.206 ( 1.785) <sup>b</sup>	-0.520 (-4.436) <sup>a</sup>
CR2	+	-0.005 (-1.034)	0.011 ( 0.881)
AvPrice	+	-0.217 (-1.080)	-0.0299 (-0.108)
PrivShare	-	-0.2954 (-0.680)	-0.1306 (-0.112)

\* Coefficients of dummy variables are not reported; t-statistics in parentheses.

<sup>a</sup> Statistically significant at  $\alpha = .01$

<sup>b</sup> Statistically significant at  $\alpha = .05$

**Figure 1. Factor Scores for 15 European Countries**



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## APPENDIX A

Nakanishi and Cooper (1982) show that Equation (1) can be estimated country by country by the following dummy variable regression:

$$y_{it}(c) = X_{it}(c) \beta(c) + \delta_i(c) + \varphi_t(c) + u_{it}(c) \quad (\text{A.1})$$

where:

- $y_{it}(c)$  = Logarithm of market share of brand  $i$  at period  $t$  in country  $c$ ,
- $X_{it}(c)$  = Vector of Logarithms of price and distribution coverage of brand  $i$  at time  $t$  in country  $c$ ,
- $\beta(c)$  = Vector of sensitivity of market share to price and distribution coverage in country  $c$ ,
- $\delta_i(c)$  = Brand  $i$  goodwill parameter,
- $\varphi_t(c)$  = Period  $t$  dummy parameter,
- $u_{it}(c)$  = error term.

Equation (A1) contains no intercept but as many brand dummies as there are brands in a country and as many period dummies as there are time periods in a country, minus one. The model combining the market share response equation (1) or (A1) and the parameter process function equation (2) should be estimated simultaneously in order to obtain efficient estimators of the parameters in equation (2). Such an estimation can be obtained by adapting the Estimated Generalized Least Squares procedure used by Gatignon (1984), Gatignon and Hanssens (1987), Gatignon, Eliashberg and Robertson (1987) and reviewed in Gatignon (1993). However, these studies specify that all the response function parameters follow a stochastic process according to the process equation (although some explanatory variables can **be excluded from the process function for some  $\beta$  coefficients**). In our case, the brand dummies as well as de period dummies are fixed and specific to each country. Therefore, in **our model, only a subset of the  $\beta$  coefficients are stochastic**.

Equation (A1) can be written for all the observations in country  $c$  as:

$$y(c) = X(c) \beta(c) + \Delta(c)\delta(c) + \psi(c)\varphi(c) + u(c) \quad (\text{A2})$$

where:

$\Delta(c)$  = Matrix of dummy variables for all brands available in country  $c$ ,  
 $\psi(c)$  = Matrix of dummy variables for all time periods except the last period.

The process equation expressed in Equation (2) can be written for the vector of response

coefficients  $\beta$ :

$$\beta(c) = \begin{bmatrix} \beta_1(c) \\ \beta_2(c) \\ \cdot \\ \cdot \\ \cdot \\ \beta_k(c) \end{bmatrix} = \begin{bmatrix} V(c) & 0 & \dots & 0 \\ 0 & V(c) & \dots & 0 \\ \cdot & \cdot & \dots & \cdot \\ \cdot & \cdot & \dots & \cdot \\ \cdot & \cdot & \dots & \cdot \\ 0 & 0 & \dots & V(c) \end{bmatrix} \begin{bmatrix} \alpha_0 \\ \alpha_1 \\ \cdot \\ \cdot \\ \cdot \\ \alpha_k \end{bmatrix} + \begin{bmatrix} \epsilon_1(c) \\ \epsilon_2(c) \\ \cdot \\ \cdot \\ \cdot \\ \epsilon_k(c) \end{bmatrix} \quad (\text{A3})$$

where:

$$V(c) = [F_1(c) \ F_2(c) \ CR2(c) \ AvPrice(c) \ PrivShare(c)]$$

or :

$$\beta(c) = Z(c) \alpha + \epsilon(c) \quad (\text{A4})$$

Inserting Equation (A4) into Equation (A2) gives:

$$\begin{aligned} y(c) &= X(c) [Z(c) \alpha + \epsilon(c)] + \Delta(c) \delta(c) + \psi(c)\varphi(c) + u(c) \\ &= X(c) Z(c) \alpha + X(c) \epsilon(c) + \Delta(c) \delta(c) + \psi(c)\varphi(c) + u(c) \end{aligned} \quad (\text{A5})$$

Writing the equation simultaneously for all the countries leads to Equation (A6):

$$\begin{aligned}
\begin{bmatrix} y(1) \\ y(2) \\ \vdots \\ y(N) \end{bmatrix} &= \begin{bmatrix} X(1) & & 0 \\ & X(2) & \\ & & \ddots \\ 0 & & & X(N) \end{bmatrix} \begin{bmatrix} Z(1) \\ Z(2) \\ \vdots \\ Z(N) \end{bmatrix} \alpha + \begin{bmatrix} X(1) & & 0 \\ & X(2) & \\ & & \ddots \\ 0 & & & X(N) \end{bmatrix} \begin{bmatrix} \epsilon(1) \\ \epsilon(2) \\ \vdots \\ \epsilon(N) \end{bmatrix} \\
+ \begin{bmatrix} \Delta(1) & & 0 \\ & \Delta(2) & \\ & & \ddots \\ & & & \Delta(N) \end{bmatrix} \begin{bmatrix} \delta(1) \\ \delta(2) \\ \vdots \\ \delta(N) \end{bmatrix} + \begin{bmatrix} \Psi(1) & & 0 \\ & \Psi(2) & \\ & & \ddots \\ & & & \Psi(N) \end{bmatrix} \begin{bmatrix} \varphi(1) \\ \varphi(2) \\ \vdots \\ \varphi(N) \end{bmatrix} + \begin{bmatrix} u(1) \\ u(2) \\ \vdots \\ u(N) \end{bmatrix}
\end{aligned} \tag{A6}$$

This can be written more concisely as:

$$y = X^* Z^* \alpha + \Delta \delta + \Psi \varphi + X^* \epsilon + u \tag{A7}$$

The last two terms on the right hand side correspond to the error term  $W = X^* \epsilon + u$ , which has the following covariance matrix:

$$\Sigma = E[WW'] = \begin{bmatrix} \sigma^2(1)I + X(1) \Omega X(1)' & & \\ & \ddots & \\ & & \sigma^2(N)I + X(N) \Omega X(N)' \end{bmatrix} \tag{A8}$$

where

$$\Omega = E[\epsilon(j)\epsilon'(j)]$$

This error term covariance structure presents the same pattern as in the random coefficient model (Swamy 1970, Judge *et al.* 1985, Greene 1993). Consequently, the same procedure can be used to derive the Estimated Generalized Least Squares Estimator. Equation A7 can be expressed as:

$$y = [M \ \Delta \ \Psi] \begin{bmatrix} \alpha \\ \delta \\ \varphi \end{bmatrix} + W \quad (\text{A9})$$

or:

$$y = M^* \gamma + W \quad (\text{A10})$$

The generalized least squares estimator is given by Equation (A11):

$$\hat{\gamma}_{GLS} = [M^{*'} \Sigma^{-1} M^*]^{-1} M^{*'} \Sigma^{-1} y \quad (\text{A11})$$

The estimated generalized least squares estimator is obtained by replacing  $\Sigma$  by a consistent estimator. Following Swamy (1970)'s procedure, such an estimator can be obtained by regressing the predictors of the response coefficients on the estimates of  $\beta$  obtained from separate country-by-country regressions. The residuals can be used to obtain an estimate of the matrix  $\Omega$  and the residuals of the individual country regressions can be used to obtain estimates of the variances  $\sigma^2(1), \dots, \sigma^2(N)$ , which, together, form  $\Sigma$ .