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## TRENDS IN PACKAGING CLAIMS FOR NEW PRODUCTS: IMPACTS ON FIRM VALUE <sup>1\*</sup>

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### Abstract

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Despite the great importance of in-store consumer decisions, the relevance of in-store stimuli, especially trends in new product packaging claims, has not been studied in depth. The role of product packaging claims about new product advantages in particular has not been addressed. This paper provides in-depth analyses of this topic by considering trends in nutritional, environmental, and production claims placed on new products. Theoretical and empirical support confirms that these claims affect firm value. The empirical analyses use more than 18,000 new products from 81 firms in the U.S. consumer packaged goods industry and apply two methodologies: time-series and panel data analyses.

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Empirical evidence is clear: In-store decisions are critical, such that 59% of purchases are unplanned before customers enter the store. Thus, in-store stimuli have great relevance (Inman, Winer, and Ferraro 2009; Stilley, Inman, and Wakefield 2010), and perhaps the most significant in-store communication element is product packaging. However, prior literature largely fails to consider how packaging claims might affect the success of products, especially innovative ones. In this context, a new product's relative advantage, which refers to whether it offers unique or superior benefits that previously did not exist or satisfies customer needs or problems better than existing products, determines whether it represents an innovation success or failure (Cooper and Kleinschmidt 1990)

The marketing effort that supports a new product can have a significant bearing on its performance too. An effective communication strategy must instruct users about the value of the product (Maidique and Zirger 1985), and consumer packaged goods (CPG) manufacturers use various advertising methods to express the benefits of their product innovations, such as nutrition/health claims (Kim, Cheong, and Zheng 2009). The benefits of these claims likely stem from international recognition of the obesity epidemic (WHO 1998), which has prompted many consumers to search for healthier foods (Chandon and Wansink 2007; Garde 2008; Geyskens et al. 2007; Wansink and Chandon 2006; Wansink and Huckabee 2005). Sales of healthy food options (e.g., organic, natural products) continue to grow, leading to trends associated with not only reducing fat, sugar, carbohydrates, calories, sodium, hormones, and caffeine but also maximizing vitamins, minerals, whole grains, omega acids, and antioxidants.

In addition to health and wellness, perhaps the most important lifestyle trend of the decade (Nielsen 2008), green marketing has experienced an important revival. After a surge of green advertising in the 1990s, the use of such claims decreased for nearly a decade. At present, its revival is evident. Major companies stress their involvement with the environment (Hartmann and Apaolaza-Ibáñez 2009; Montoro, Luque, and Rodriguez 2008) and reengineer products and process according to green standards (Chitra 2007). The Natural Marketing Institute (NMI) estimates that the size of the green marketplace will be \$420 billion in 2010 (Mooth 2009), though even this dominance leaves room for growth into untapped categories. Nearly half of U.S. adults say they want to buy green products but choose conventional ones instead. Furthermore, recent analyses indicate that the green trend can survive the recession (Neff 2009). Because consumers have come to recognize that their consumption activities contribute to environmental issues, they express a desire to protect the environment and look for products that do not degrade the environment.

Therefore, consumer demand should increase manufacturers' motivation to innovate and introduce new products with improved nutritional or environmental attributes (Montoro, Luque, and Rodriguez 2008). Responding to customers' needs with innovative products induces a positive impact on firm performance and value, as market orientation literature shows (Maydeu-Olivares and Lado 2003). Moreover, recent research proposes that market orientation is a necessary condition for obtaining the benefits of integrated marketing communications on external performance measures (Reid, Luxton, and Mavondo 2005). The role of packaging claims, as part of the communication strategy of the firm, deserves further investigation, and this article proposes to study manufacturers' current practices.

We extend prior literature in several ways. First, we examine the uses of packaging claims during 1996–2006 to reveal trends in the CPG industry. Second, we investigate several different types of claims, including environmental, negative nutrition attribute, positive nutrition attribute, and production method claims. Previous studies mainly consider environmental claims (e.g., Banerjee, Gulas, and Iyer 1995), nutrition claims (e.g., Baltas 2001), or health claims (e.g., Fitzgerald and Russo 2009) separately; some other studies analyze specific claims, like low-fat promises (e.g., Wansink and Chandon 2006). Production method claims appear rarely in prior research. Third, we analyze how package claims that appear on new products affect firm value. Most previous studies adopt a consumer perspective to address the effect of advertising claims. For example, a common approach analyzes how claims affect consumer perceptions, attitudes, or behavior (e.g., Anstine 2007; Baltas 2001; Bredahl 2001; Grunert et al. 2009; Hartmann and Apaolaza-Ibañez 2009; Kozup, Creyer, and

Burton 2003; Wansink and Chandon 2006). Analyses of how package claims affect firm value are missing.

In analyzing trends in packaging claims, we provide theoretical and empirical support for their effects on firm value. Following previous literature, we differentiate incremental from breakthrough innovations (Sorescu and Spanjol 2008), such that we assess four groups of product claims and both types of innovation to differentiate the influences on firm value. Our measure of firm value refers to the minimum compensation that investors require to purchase stock in a company. This measure is appropriate because undertaking innovation entails important risks that investors consider before investing.

Furthermore, we consider a sample of CPG firms in the U.S. market and apply both time-series and panel data analysis methodologies. The time-series analyses enable us to detect claim trends, and the panel data model, which consists of a generalized least squares fixed effect model helps us determine the effect on firm value. We take into account the pace of introducing innovations and the results derived from them, such that the innovation and claims variables are lagged one year to capture the dynamics of the process.

In the next section, we review relevant previous research. Then we describe the methodology for our empirical analysis, followed by our findings. Finally, we offer some main conclusions and implications of our findings.

## LITERATURE REVIEW

### Advertising Claims

The use of specific advertising claims has shifted over time. Easterling, Kenworthy, and Nemzoff (1996) find great variation in environmental advertising frequency over the 25-year period they study; similar trends emerge pertaining to other claims. Today, for example, it is common to use nutrition and health claims on food products (Kim, Cheong, and Zheng 2009; Parker 2003), but decades ago, such claims were infrequent (Lord, Eastlack, and Stanton 1987), and their use has increased gradually over time (Ippolito and Pappalardo 2002; Klassen, Wauer, and Cassel 1991). Perhaps trends in advertising claims relate to changes in regulation; as Ippolito and Pappalardo (2002) note, different nutrition and health advertising claims appear associated with changes in regulatory rules.

Advertising claims are subject to regulation that prohibits deceptive trade practices. Hastak, Mazis, and Morris (2001) trace the progression of environmental advertising regulations. In the 1970s and 1980s, consumers became more concerned about the environment and expressed interest in purchasing products with environmentally friendly attributes. Marketers responded by communicating the environmental benefits of their products through both advertising and labeling claims. General (e.g., “safe for the environment”) and specific (e.g., recyclable) environmental claims proliferated in the marketplace, but consumers suffered some confusion about the meaning of specific terms. This confusion attracted the attention of consumer groups and regulators, who established rules regarding the claims companies could make for their products. Prior environmental advertising literature thus classifies claims into four types, according to their product, process, image, or factual orientation (Carlson, Grove, and Kangun 1993). The most prevalent has been a product orientation (Easterling, Kenworthy, and Nemzoff 1996). With our focus on new products, we consider specific environmental claims for new products (e.g., recyclable, biodegradable), as we list in Table 1.

[Place table 1 about here](#)

Similar historical trend mark the development of nutrition and health claims: Demand for healthy products prompted greater use of health claims on packaging, which stimulated legislators to regulate these claims (Ippolito and Mathios 1993). As Parker (2003) recognizes, the regulatory, marketing, and nutritional issues surrounding the use of health and nutrition-related advertising claims by food companies are complex and constantly evolving. In 1984, Kellogg’s was the first big company to issue health claims on its All-Bran cereal (i.e., linking the

high fiber product to cancer prevention; Lord, Eastlack, and Stanton 1987). In 1990, the Food and Drug Administration dramatically changed existing regulations with the Nutrition Labeling and Education Act (NLEA, 1990), which introduced new food labeling requirements, including the specification of nutrient contents and health claims on all food packaging. It also regulated serving sizes, health claims, and nutrition claims (Balasubramanian and Cole 2002).

Nutrition claims may be positive or negative (Russo et al., 1986). A negative nutrient refers to a nutritional characteristic that should be reduced; a positive nutrition attribute is one to increase for improved health. Examples of negative nutrients include calories, sugar, sodium, fat, and cholesterol, whereas calcium, fiber, or vitamins represent positive nutrients. Russo and colleagues (1986) find that in terms of influencing customers' food purchases, negative nutrients are more influential than information about positive nutrients, because no food supplement can reduce consumption of negative nutrients. Similarly, Balasubramanian and Cole (2002) find that consumers are more interested in food with less or no negative attributes than food with higher positive nutrition attributes. It appears the NLEA increased consumers' sensitivity to negative attributes. This emphasis on negative attributes may be explained by prospect theory (Tversky and Kahneman 1981), according to which people grant more weight to losses than to gains.

We address specific nutrient content claims that describe the level of a nutrient in a food product (e.g., low fat, high calcium) and distinguish between negative and positive attributes. Previous studies further show that nutrition claims are more useful for and have more influence on customer behavior than Nutrition Facts panels (Balasubramanian and Cole 2002; Ippolito and Mathios 1993), which gives manufacturers an incentive to use claims to obtain a competitive advantage over competitors. Because consumers prefer to avoid negative outcomes, we anticipate that manufacturers launch new products by making more positive than negative attribute claims (see Table 1 for the nutrition claims we consider).

Finally, in a growing trend, manufacturers declare the production methods they have used. Prior research considers negative or scary production method claims, but the disclosure of positive food production methods, such as organic farming, could be important. Such information is not a nutrition or health issue, because production methods are not directly or explicitly related to nutritional properties (Baltas 2001). Yet consumers likely associate production methods with healthier and environmentally responsible products (Banerjee, Gulas, and Iyer 1995; Bredahl 2001; Nielsen 2007). Moreover, to avoid consumer confusion or misleading manufacturer practices, some production claims, including organic and natural claims, are regulated (United States Department of Agriculture 2005). In recent decades, biotechnology and other advances have enabled agriculture to increase vastly the amount of food produced but also have raised questions about the safety of the food products. For example, genetically modified products have prompted significant consumer resistance (Mather, Knight, and Holdsworth 2005) and perhaps prompted a backlash in the form of people buying more food labeled all-natural or organic (Anstine 2007). We therefore analyze this claim type, as we report in Table 1.

Existing arguments about consumers' environmental, nutrition, and health concerns imply firms should pursue a preferred market positioning by using advertising claims and thus improve their firm value. However, another argument supports a different strategy. Keller and colleagues (1997) propose that consumers are suspicious about claims, consistent with the persuasion knowledge model (Friestad and Wright 1994). For example, consumers may view a package claim solely as a persuasive tactic, designed to help to sell the product. If other information from their memory or on the label appears inconsistent with the claim, the consumer may question the manufacturer's credibility, which would not have a positive effect on product judgments. We clearly need more research to understand manufacturers' practices and how they affect firm performance.

Innovation and Advertising Effects on Firm Value

Widespread theoretical and empirical discussions consider the effect of innovation on firm value (e.g., Sorescu and Spanjol 2008) and how advertising affects firm value (Joshi and Hanssens 2010; Srinivasan and Hanssens 2009). Marketing literature offers mixed empirical results about the effect of innovation on firm value (e.g., Sorescu and Spanjol 2008), which may reflect different metrics of firm value, differences in product- or firm-level analyses, or the different effects of breakthrough versus incremental innovations.

Advertising attempts to differentiate a firm's offer from those of competitors and should have a positive impact on brand equity. It also can influence firm value, through increased sales and profits and indirectly through intangible value creation (Joshi and Hanssens 2010). For this study, we include packaging as a form of advertising. A message is advertising, "so long as it carries a strategic message, such as performance claims, [and] packaging is just another vehicle for delivering that message," so "Logos and packaging are ALWAYS advertising" (Richards and Curran 2002, p. 73). Yet empirical research generally ignores this form of advertising (Motes and Woodside 1984), particularly the claims that appear on product packages (Ernst 2009; Fitzgerald and Russo 2009; Polonsky et al. 1998). Considering though the importance of in-store decision making and the relevant role of communicating a differential advantage for innovation success, we predict a positive impact of innovation claims on product packages on both sales and firm value.

#### EMPIRICAL STUDY

##### Study Scenario and Data

We consider the U.S. CPG industry and construct a data set by gathering data from multiple sources (Compustat Global, Productscan). Because innovation efforts and claims differ within the CPG industry, we distinguish seven product areas: food, canned, cereal, beverage, cleaning, cosmetics, and others. For our study, each firm represents a single industry, according to its four-digit standard industrial classification code, which indicates its main declared activity, independent of other activities by the firm. For example, Procter & Gamble represents the cleaning industry. Our final sample consists of 81 publicly traded firms that introduced at least one new product between 1996–2006, for a total sample of 18,512 new product introductions.

In Table 2, we report descriptive information about the new product introductions for each industry considered, as well as jointly across industries.

##### [Place table 2 about here](#)

We classify these new product introductions as incremental or breakthrough. We then consider their specific claims to assign the products to the environmental, negative attribute, positive attribute, or production method claim categories. The cosmetics product area provides the highest number of new product introductions (6,056) followed by cleaning products (2,705) and cereal (1,962). As expected, breakthrough innovations are only a small proportion of the introductions (5.5%), including 229 in the cleaning and 78 in the canned group. Moreover, these claim types are common for new product introductions, such that 40% of new products use some of them. The production claims are the most frequent (4,613), followed by negative attribute (2,800) and positive attribute (2,405) claims. Environmental claims are the least frequent. We also observe differences across product areas, with similar patterns in the food, canned, cereal, and beverage groups. These product areas follow the trend of the overall sample (i.e., production claims, negative attribute, positive attribute, and environmental claims, in order of frequency), whereas in the cleaning and cosmetic areas, production claims are still the most commonly used, but positive claims come second, followed by environmental claims, and finally by negative attribute claims. We summarize these findings in Table 3.

##### [Place table 3 about here](#)

In the specific claim level, we find that "recyclable" is the most widely used environmental claim in the food, canned, cereal, and beverage areas; for cleaning products, "biodegradable" ranks first, and "reusable" takes this position for cosmetics. "Vitamins" is the most widely

employed positive attribute claim in all industries except food, for which “minerals” ranks first (“minerals” is also common in the other industries). “Fiber” is frequent for the food and cereal areas. Of the negative nutrient claims, “fat” is the most frequent in the food, canned, cereal, and beverage areas, and “calories” for beverages and “cholesterol” for food also are common. For the production claims, the most often employed claim is “natural” for all product areas, followed by “real” in the canned, cereal, and beverage groups, “organic” for food, “fresh” for cleaning products, and “allergy” for cosmetics. In the third position in the food, canned, and cereal areas appears “preservatives,” but this position is occupied by “pure” in the beverage and cosmetic groups and “phosphates” for cleaning products.

#### Methodology

*Time-series analyses.* We analyze the evolution of claims using deterministic trend analyses, such that we can check for systematic and continuing increases (decreases) in the use of particular claims by new products over time. To test for the presence of a deterministic trend, we use a linear regression model with  $\alpha$  as the dependent variable, year as the independent variable, and  $\mu_t$  as the error term:

$$\alpha_t = \beta_0 + \beta_1 \text{Year}_t + \mu_t. \quad (1)$$

Both  $\beta_0$  and  $\beta_1$  are parameters to be estimated. A significant positive coefficient for  $\beta_1$  confirms an increase; a negative coefficient implies a decline. For our proposed model, the null hypothesis predicts a non-significant trend effect. With this model and consideration of the statistical significance of an effect, we can determine the size of the trend effects in our findings.

We estimate several deterministic trend analyses using different dependent variables. All the dependent variables employ ratios, because we divide the variable of interest by the total number of new products launched each year. Therefore, we use proportions to control for the evolution of the launch of new products over time as well. In Table 4, we describe three groups of trend analyses pertaining to the use of claims on new products.

#### [Place table 4 about here](#)

First, two variables—claims (number of new products that use any claims) and no claims (number of new products that do not use any claims)—reveal a significant positive and significant negative coefficient, respectively. Therefore, we find a positive trend in the use of claims to launch new products. Second, for ten variables that reflect the number of new products that use one to ten claims, we find significant positive coefficients for all cases except one claim, which remains insignificant. The use of three (effect size = .003), two (.002), four (.002), and five (.001) claims reveal the most important positive trends. Third, of the four variables pertaining to the type of claim—EC, or the number of new products that use environmental claims; PAC, the number of new products that use positive attribute claims; NAC, or the number of new products that use negative attribute claims; and PC, which refers to the number of new products that use production claims—we find that PAC and PC have significant positive coefficients, and PAC shows the highest positive evolution effect (.01).

We next undertake an in-depth investigation of each specific claim and provide the estimation results in Table 5. For environmental claims, we find a significant positive coefficient for refill, reusable, and biodegradable. Regarding the positive attribute claims, the specific claims reveal significant positive coefficients, with the exception of amino acids and fruit. Those claims with the highest positive evolution are vitamins (.01), protein and fiber (.003), and antioxidants (.002). However, the trend differs for negative attribute claims. Only calories have a significant positive coefficient (.002); fat and cholesterol show significant negative coefficients, which imply a decline on their use. The other specific claims are insignificant. Finally, for production claims, we find that 11 of the 21 specific claims we consider have significant positive coefficients; in order of the effect size, they are natural (.004); organic, fresh, pure, and real (.002); artificial color, flavor, and genetic modification (.001); pesticides (.0005); perfumes (.0004); and formaldehyde (.0001).

#### [Place table 5 about here](#)

*Panel data analyses.* Our main hypothesis refers to the influence of advertising claims and innovation outputs on firm value, accounting for industry differences. To test the cause of the differences, we consider the use of claims on new product packaging. We use three measures of firm performance that feature both financial and operative assessments: (1) the market value to book value ratio (MVBV), (2) beta ( $\beta$ ), and (3) return on assets (ROA). We measure MVBV in line with the method employed in traditional financial literature, that is, the ratio between market value and firm value. The  $\beta$  variable evaluates a firm's risk by market, and monthly fundamental  $\beta$  measures the sensitivity of a company's stock price to overall fluctuations in the preselected index for that company's country. Finally, ROA reflects the profitability derived from the economic assets deployed to support a firm's activities, such that it equals the ratio of economic profits to total assets. We analyze the effect of innovation and claims on firm value using the following model:

$$Y_{it} = \alpha_i + \gamma_{1i} BI_{it-1} + \gamma_{2i} II_{it-1} + \gamma_{3i} Claim_{it-1} + \gamma_{4i} TA_{it} + \gamma_{5i} OS_{it} + \gamma_{6i} FAI_{it} + \gamma_{7i} Dummy1996_t + \dots + \gamma_{6i} Dummy2005_t + \varepsilon_{it}, \quad (2)$$

where  $Y_{it}$  = MVBV,  $\beta$ , or ROA in year  $t$  for firm  $i$ ;  $BI_{it-1}$  is the number of breakthrough products launched in year  $t - 1$  by firm  $i$ ;  $II_{it-1}$  is the number of incremental products launched in year  $t - 1$  by firm  $i$ ; and  $Claim_{it-1}$  is the number of new products launched in year  $t - 1$  by firm  $i$  with some claim type. We build four claim type variables: EC (environmental), NAC (negative attribute), PAC (positive attribute), and PC (production method). We also include determinants of firm values from previous literature as control variables:  $TA_{it}$  for firm size, measured as the logarithm of total assets of firm  $i$  in year  $t$ ;  $OS_{it}$  for organization slack, measured as the ratio of cash flows to total assets; and  $FAI_{it}$ , or fixed assets intensity, which is the ratio of fixed assets to total assets. In addition,  $Dummy1996_t$  to  $Dummy2006_t$  are year dummies that we include for our panel data.

As a first estimation step, we test whether to estimate our equation by considering the effects as fixed or random. A Hausmann test ( $\chi = 5.75$ ) reveals that fixed effects provide a better estimation procedure; therefore, we have confidence in the appropriateness of separating the estimations according to the different segments in which firms operate.

Because our interest focuses on the influence of innovation on firm value, we might face an endogeneity problem, derived from our innovation variable. This variable provides information about new breakthrough products launched by a firm, but more radical new products also demand more advertising effort by the firm. Because we use a count variable, it is not possible to employ proper instrumental methods. Thus, we control for it using innovation variables (breakthrough and incremental), lagged by one year. The estimation process is parsimonious and includes each advertising claim. For each claim, we estimated one equation, but we provide the combined estimations in our findings.

#### ANALYSIS AND DISCUSSION

Table 6 contains the descriptive statistics of the main variables and their correlations. We observe the strong correlation among all claim categories, which aligns with the time-series analyses, which reveal an evolution over time for a multiple-claims strategy. That is, manufacturers appear to introduce more and more claims on packaging. The risks of information overload or fuzzy positioning thus deserve more research.

[Place table 6 about here](#)

The panel data analysis results vary according to the dependent variable we investigate, and the effects of claim are very different across segments. For the MVBV ratio, environmental claims have positive effects on the beverages; nutrition and production claims exert positive influences for food; in the canned category, only production claims reveal a positive influence, whereas in the cereal category, a positive effect results from negative attributes. However, the production claim has a negative impact on firm value for cosmetics companies. Firm risk is very sensitive in the food segment; the higher risk associated with breakthrough innovations, as in the beverage segment, may reflect the greater benefits derived in this segment. However, we find opposite results in the food segment, where breakthrough innovations reduce firm risk

and incremental innovations increase it. All claims are positive and significant in the food segment, except for the environmental claim, which reduces firm risk. The positive attributes of nutrition also influence firm risk negatively in the cereal segment.

Finally, the economic profitability equation reveals different results in terms of innovation activity. In the cosmetics segment, a breakthrough innovation provides more profitability; incremental innovation decreases it though. In the canned segment, incremental innovation increases profitability; in the food segment, a breakthrough innovation decreases it. For this performance indicator, claims have essentially no effect in relation to positive nutrition attributes in the beverage and negative attributes in the canned segments.

All control variables have significant effects for the various performance estimations, . Thus, the organizational structure of the firm is highly important for conferring a competitive advantage on companies that exploit their advertising and innovation strategies in combination. The fixed asset intensity and organizational slack variables are significant in many cases, which indicates that firms without a specific organizational form cannot achieve success.

## CONCLUSIONS

This research, to the best of our knowledge, is the first study to focus on how advertising claims that appear on packaging influence firm value. We provide empirical evidence of the differential impacts of three types of advertising claims: nutritional, environmental, and production. Furthermore, our longitudinal analysis over 1996–2006 in the context of new products introduced in the CPG industry reveals several key trends that represent responses to major societal concerns. Responding to customer needs is a pillar of market orientation literature, which focuses on the customer and reveals that being market driven has a positive impact on firm performance.

In particular, this research identifies a trend toward introducing multiple claims on the same package. New products provide various claims that refer to nutritional, environmental, and production advantages at the same time. We also detect trends in the usage of claims. In the study period, positive nutritional attribute claims increased, especially those related to the presence of vitamins or fiber. The evolution of production claims also has been positive; many new products cite natural or organic claims, but the launch of new products that use fat or cholesterol claims is declining. These results confirm that firms respond to consumer needs and launch innovative products with improved positive nutritional and production attributes.

In the analysis of the panel data, in methodological terms, we use an estimation method that can identify fixed effects using segments in which firm operates. These fixed effects associated with operational categories suggest separating the estimation results by category; we find meaningful variations across both categories and the three types of firm performance measures. The value of cosmetic, food, canned, cereal, and beverages firms depends on claims that emphasize attributes of the new product launched; food firms' value depends on risk perceptions. Beverage and canned companies benefit more, in terms of profitability, from the claims they use.

For the food category, claims that highlight positive attributes and production methods enhance the ratio of market value to book value. However, environmental claims have no impact, which mirrors previous research that suggests consumers are skeptical about such claims (Scammon and Mayer 1995; Schuhwerk and Lefkoff-Hagius 1995; Zinkhan and Carlson 1995). Moreover, environmental claims are less common. These results suggest the importance of establishing a new product advantage; managers must communicate new product advantages in a clear way and avoid introducing too many claims simultaneously that dilute the positioning of the new product.

Overall, we find that the packaging claims' communicative power is significant, especially for new products launched in CPG categories. This form of advertising represents the key element for communicating product benefits, such that packaging plays the role of a silent but expressive vendor.

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TABLE 1.  
Claims Type Description

Claim Type	Claim Analyzed
Environmental (EC)	Recyclable or recycled materials, reduced packaging, refill, reusable, and/or biodegradable.
Positive Attributes (PAC)	Amino acids, antioxidants, fiber, fruit, minerals (minerals in general, calcium, iron, or magnesium), omega (3 or 6), protein, and/or vitamins.
Negative Attributes (NAC)	Alcohol, caffeine, calories, carbohydrates, cholesterol, fat (fat, saturated fat, or trans fat), sodium, and/or sugar.
Production (PC)	Organic, natural, fresh, pure, and/or real. No abrasives, additives, allergy, animal, artificial (color, flavor, or ingredients), sweeteners, carbonation, chemicals, formaldehyde, genetic modification, perfumes, pesticides, phosphates, and/or preservatives.

TABLE 2.  
Descriptive Information

	Other	Food	Canned	Cereal	Beverage	Clean	Cosmetic	Total
New product introductions	3,231	1,373	1,309	2,086	1,523	2,934	6,056	18,512
Incremental innovation	3,065	1,275	1,231	1,962	1,408	2,705	5,834	17,480
Breakthrough Innovation	166	98	78	124	115	229	222	1,032
Claims	1,615	914	669	1,081	879	984	1,221	7,363
II with claims	1,522	853	627	1,016	815	900	1,159	6,892
BI with claims	93	61	42	65	64	84	62	471
Environmental claims	74	49	41	67	71	227	137	666
Positive attribute claims	426	297	163	463	326	303	427	2,405
Negative attribute claims	855	516	314	487	453	121	54	2,800
Production claims	939	673	441	672	526	587	775	4,613

TABLE 3.  
Descriptive Information by Claim Type

	Other	Food	Canned	Cereal	Beverage	Clean	Cosmetic	Total
<b>EC</b>								
Recyclable	51	33	34	63	69	75	12	337
Reduced packaging	1	1	0	0	1	6	0	9
Refill	2	0	1	0	0	48	21	72
Reusable	17	18	6	6	1	65	108	221
Biodegradable	3	0	0	0	0	108	6	117
<b>PAC</b>								
Amino acids	1	1	0	0	4	44	1	51
Antioxidant	9	21	3	6	14	21	65	139
Fiber	86	90	30	108	31	18	7	370
Fruit	17	5	37	18	64	2	1	144
Minerals	214	115	56	210	149	49	50	843
Omega 3	5	15	2	3	5	12	7	49
Omega 6	0	0	0	0	0	7	0	7
Protein	123	91	29	68	33	44	33	421
Vitamins	223	55	102	318	220	252	358	1,628
<b>NAC</b>								
Alcohol	5	2	20	0	13	44	31	115
Caffeine	51	67	4	1	50	16	8	197
Calories	192	70	67	70	155	13	8	575
Carbohydrates	59	31	23	24	42	0	4	183
Cholesterol	151	101	66	63	38	5	2	426
Fat	575	345	187	399	228	42	10	1,786
Sodium	48	74	51	23	70	4	0	270
Sugar	155	67	64	39	86	17	6	434
<b>PC</b>								
Organic	136	202	86	79	23	20	34	580
Natural	351	419	168	274	290	237	315	2,054
Fresh	195	94	70	118	78	152	64	771
Pure	101	40	17	18	88	74	114	452
Real	332	153	119	269	132	31	46	1,082
Abrasives	0	0	0	0	0	1	0	1
Additives	15	5	4	12	1	2	1	40
Allergy	0	0	0	0	0	36	255	291
Animal	6	1	0	1	0	60	17	85
Artificial color	70	122	53	27	23	21	29	345
Artificial flavor	59	126	68	39	30	5	3	330
Artificial ingredients	18	28	17	10	11	4	0	88
Sweeteners	21	8	16	17	12	0	0	74
Carbonation	7	1	1	0	39	1	0	49
Chemicals	7	12	4	13	0	10	6	52
Formaldehyde	0	0	0	0	0	0	15	15
Genetic modification	12	71	0	6	10	0	0	99
Perfumes	15	0	0	0	0	9	1	25
Pesticides	26	32	13	13	0	7	0	91
Phosphates	14	0	0	0	0	114	12	140
Preservatives	134	158	104	88	82	10	2	578

Notes: EC = environmental claims, PAC = positive attribute claims, NAC = negative attribute claims, and PC = production claims.

TABLE 4.  
Trends in the Use of Claims

	Year		
	$\beta_1$	Standard Deviation	$p$ -Value
Claims/No claims			
Claims	.01	.003	.00
No claims	-.01	.003	.00
Number of claims			
1 claim	.002	.002	.38
2 claims	.002	.001	.04
3 claims	.003	.0008	.00
4 claims	.002	.0004	.00
5 claims	.001	.0002	.00
6 claims	.0006	.0002	.01
7 claims	.0005	.0002	.07
8 claims	.0004	.0001	.03
9 claims	.0002	.0001	.08
10 or more claims	.0002	.00008	.00
Claims type			
EC	.0005	.001	.64
PAC	.01	.001	.00
NAC	-.002	.004	.57
PC	.009	.001	.00

Notes: EC = environmental claims, PAC = positive attribute claims, NAC = negative attribute claims, and PC = production claims.

TABLE 5.  
Trends of Specific Claims

	Year		
	$\beta_1$	Standard Deviation	$p$ -Value
EC			
Recyclable	-.001	.0008	.11
Reduced pack	.00002	.00008	.77
Refill	.0008	.00009	.00
Reusable	.001	.0004	.00
Biodegradable	.001	.0003	.02
PAC			
Amino acids	.0009	.0006	.13
Antioxidant	.002	.0007	.00
Fiber	.003	.0007	.00
Fruit	-.00001	.0003	.95
Minerals	.006	.001	.00
Omega 3	.0005	.0001	.00
Omega 6	.0001	.00006	.03
Protein	.003	.0004	.00
Vitamins	.01	.001	.00
NAC			
Alcohol	-.00002	.0001	.85
Caffeine	.0003	.0002	.22
Calories	.002	.001	.07
Carbohydrates	.002	.001	.12
Cholesterol	-.0007	.0004	.10
Fat	-.006	.003	.05
Sodium	.00002	.0005	.96
Sugar	.002	.0009	.04
PC			
Organic	.002	.0008	.01
Natural	.004	.001	.02
Fresh	.002	.0007	.02
Pure	.002	.0007	.01
Real	.002	.0008	.03
Abrasives	.00001	.00001	.55
Additives	-.0001	.0002	.61
Allergy	.00008	.0005	.88
Animal	.00003	.0002	.88
Artificial color	.001	.0004	.01
Artificial flavor	.001	.0006	.07
Artificial ingredients	.0002	.0002	.30
Sweeteners	.0001	.0002	.49
Carbonation	-.00006	.0001	.56
Chemicals	.00006	.0002	.75
Formaldehyde	.0001	.00006	.08
Genetic modification	.001	.0003	.01
Perfumes	.0004	.0002	.04
Pesticides	.0005	.0002	.04
Phosphates	.0006	.0003	.13
Preservatives	-.0001	.0005	.81

Notes: EC = environmental claims, PAC = positive attribute claims, NAC = negative attribute claims, and PC = production claims.



TABLE 7.  
Generalized Least Squares Fixed Effects: Results by Segments

	OTHERS	FOOD	CANNED	CEREAL	BEVERAGE	CLEANING	COSMETIC
Dependent variable: MVBV							
N° observations	123	34	53	61	51	38	35
Constant	-17.785 (1.43)	4.131 (1.66)	3.756 (1.04)	-5.537*** (2.47)	-8.257*** (5.24)	-13.699*** (2.60)	-6.536 (1.22)
BI	.162 (.80)	.091 (1.54)	-.001 (.09)	-.002 (.09)	-.067 (1.36)	-.025 (.46)	.024 (.80)
II	.004 (.17)	.002 (.17)	-.004** (1.77)	-.001 (.37)	-.001 (0.04)	.005 (.57)	-.001 (.53)
EC	-.157 (0.44)	-.015 (.19)	.013 (.67)	-.026 (.73)	.070** (1.70)	-.024 (.44)	.004 (.11)
PAC	.038 (.38)	.027** (1.75)	.016 (1.56)	-.014 (.88)	.015 (.76)	.009 (.60)	.001 (.03)
NAC	.027 (.49)	.029*** (2.15)	.001 (.20)	.036*** (1.99)	-.003 (.18)	-.036 (.47)	-.049 (.76)
PC	.035 (.37)	.021*** (2.48)	.012* (1.65)	-.009 (.41)	.053 (1.51)	-.008 (.29)	-.028*** (3.31)
TA	2.237 (1.53)	-.580** (1.75)	-.441*** (3.30)	.736*** (2.63)	1.257*** (5.93)	2.002*** (2.81)	.906 (1.21)
OS	.001 (.31)	.001 (.00)	-.001 (.86)	-.001 (.15)	.001 (.54)	.001 (.02)	.001 (.45)
FAI	.523 (.74)	.015*** (2.20)	-.106*** (2.75)	.188 (1.41)	.019** (1.76)	.008 (.06)	-.002 (.10)
Wald test <sup>2</sup> (15)	11.76 (.697)	32.26 (.005)	37.83 (.000)	22.18 (.103)	87.62 (.000)	18.00 (.263)	42.87 (.000)

Dependent variable: BETA RISK							
N° observations	129	38	50	67	49	38	34
Constant	-2.071 (0.16)	-4.875 (.28)	-24.67 (1.46)	-38.57 (1.31)	-2.004 (.13)	16.63 (.51)	27.67 (.35)
BI	-.448** (1.84)	-.831*** (1.92)	.242 (1.02)	-.023 (.07)	.787** (1.83)	-0.087 (.25)	-.375 (.90)
II	.002 (.79)	.207*** (2.20)	.012 (.33)	-.011 (.26)	-.034 (.78)	-.014 (.27)	-.016 (.55)
EC	-.256 (.44)	-1.381** (1.83)	-.128 (.40)	.056 (.12)	.321 (.80)	.305 (.87)	.081 (1.55)
PAC	-.155 (1.04)	.421*** (3.35)	.172 (1.03)	-.352*** (1.97)	.264 (1.41)	.019 (.19)	-.179 (.98)
NAC	.055 (.60)	.382*** (3.48)	.125 (1.13)	.184 (.86)	-.065 (.46)	.393 (.82)	1.321 (1.19)
PC	.080 (.55)	.256*** (3.61)	.069 (.56)	-.252 (1.03)	.075 (.22)	-.099 (.54)	-.068 (.36)
TA	.984 (.64)	.609 (.25)	2.406 (1.12)	5.294 (1.42)	.168 (.08)	-2.766 (.61)	-2.512 (.23)
OS	-.011*** (3.69)	-.006 (.65)	.003* (1.62)	.001 (.35)	-.002 (.14)	-.003 (.67)	.002 (0.27)
FAI	-.417 (.54)	.088 (1.37)	2.509*** (3.96)	-.079 (.06)	.206*** (2.01)	1.370 (1.52)	.298 (.86)
Wald-test <sup>2</sup> (15)	60.98 (.000)	52.06 (.000)	62.63 (.000)	26.78 (.030)	24.65 (.054)	27.95 (.022)	18.58 (.233)

Notes: BI = breakthrough innovation, II = incremental innovation, EC = environmental claims, PAC = positive attribute claims, NAC = negative attribute claims, PC = production claims, TA = total assets, OS = organizational slack, FAI = fixed assets intensity. Table entries show the coefficient values, with t-statistics in parentheses.

TABLE 7 (cont.)  
Generalized Least Squares Fixed Effects: Results by Segments

Dependent variable: ROA							
N° observations	151	39	55	67	55	38	42
Constant	-108.10 (.54)	-168.11 (.94)	-184.75*** (8.72)	374.12 (1.17)	296.29*** (2.06)	-127.02*** (3.36)	-341.23*** (2.99)
BI	.611 (1.10)	-9.298** (1.81)	4.482 (1.51)	-1.449 (.38)	-5.331 (1.18)	2.266 (.57)	6.029** (1.71)
II	.158 (.32)	.268 (.34)	1.167*** (2.37)	.152 (.34)	.586 (1.42)	.347 (.58)	-1.316*** (3.06)
EC	-.692 (.06)	3.356 (.45)	.664 (.16)	5.536 (1.06)	3.224 (.85)	-.850 (.21)	11.111 (1.19)
PAC	.297 (.21)	.297 (.21)	-1.280 (.59)	1.078 (.53)	3.206** (1.88)	-.895 (.78)	-.278 (.09)
NAC	-.018 (.01)	.014 (.01)	2.835*** (2.05)	-.592 (.25)	.171 (.13)	-4.784 (.89)	-20.489 (1.12)
PC	-1.455 (.53)	.337 (.43)	.628 (.42)	1.311 (.48)	.733 (.23)	-.950 (.46)	-2.401 (.83)
TA	14.08 (.58)	30.690 (1.29)	243.97*** (9.05)	-42.239 (1.04)	-27.767 (1.43)	169.28*** (3.30)	492.19*** (3.10)
OS	.105*** (2.02)	-.138* (1.63)	.005*** (2.35)	.003 (.07)	-.243** (1.81)	.169*** (3.04)	.341*** (3.35)
FAI	16.75*** (2.02)	-.678 (1.18)	46.957*** (6.07)	.265 (.02)	1.019 (1.04)	24.299*** (2.39)	-18.25*** (3.00)
Wald-test <sup>2</sup> (15)	14.45 (.491)	10.67 (.775)	107.36 (.000)	20.57 (.151)	15.35 (.426)	59.49 (.000)	54.44 (.000)

Notes: BI = breakthrough innovation, II = incremental innovation, EC = environmental claims, PAC = positive attribute claims, NAC = negative attribute claims, PC = production claims, TA = total assets, OS = organizational slack, FAI = fixed assets intensity. Table entries show the coefficient values, with t-statistics in parentheses.