



*International Food and Agribusiness Management Review*  
*Volume 10, Issue 1, 2007*

## **Growth-related Measures of Brand Equity Elasticity for Food Firms**

Thomas L. Sporleder<sup>a</sup> and Juan Liu<sup>b</sup>

<sup>a</sup> *Professor, Department of Agricultural, Environmental and Development Economics,  
2120 Fyffe Rd, The Ohio State University, Columbus, Ohio 43210, USA*

<sup>b</sup> *Former Research Associate, Department of Agricultural, Environmental and Development  
Economics, 2120 Fyffe Rd, The Ohio State University, Columbus, Ohio 43210, USA*

---

---

### **Abstract**

Brand names and brand equity are recognized as important intangible assets among firm managers in the global food supply chain. This analysis investigates the long-run potential of brand equity among food processors to actually create real options for a firm's management. The empirical analysis views brand equity among food processors as a real option of growth and empirically tests selected drivers that are conceptually associated with firm growth. Results indicate that brand equity has a positive effect on the growth option value of the firm, after accounting for other major drivers of firm growth. Brand equity elasticity is estimated with respect to a firm's growth value for both the industry- and firm-level. One major implication of the analysis is that managers of food firms should evaluate the efficacy of brand equity building strategies in terms of the contribution brand equity makes to the firm's growth option value. The evidence suggests that categorizing and managing advertising expenditures solely as an expense item may be too narrow from a strategic viewpoint.

**Keywords:** brand equity; brand valuation; real options; food firms; growth option value

---

<sup>①</sup>Corresponding author: Tel: + 614-292-0286  
Email: [sporleder.1@osu.edu](mailto:sporleder.1@osu.edu)  
Other contact information: Juan Liu: [liu.522@osu.edu](mailto:liu.522@osu.edu)

## **Introduction**

Real options logic provides a novel approach for examining firms' long-term specific investment which may have option-like properties (McGrath et al., 2004). This investigation posits that brand equity captures real options components in the sense of brand extension potential and therefore future firm growth in the long-run. The relationship between brand equity and a firm's growth is examined empirically by estimating an elasticity of brand value with respect to food and beverage firms' growth option value. This elasticity estimate provides an empirical means of tying a change in brand equity to a change in the growth value of the food firm.

## **The Importance of Brand Equity**

Brand equity is an important element of the total intangible asset base of firms, especially in the global food system. Firm assets often are categorized as tangibles composed of the 'hard' assets such as land, buildings, machinery, and equipment along with the intangibles, representing the so-called 'soft' assets of the firm. Brand equity is one of several different types of intangibles that a firm may own. Other intangibles assets may include copyrights, trademarks, patents, firm specific knowledge, and the social capital of its employees. Intangibles may be an important part of competitive strategy for a firm by providing the basis for an advantage over rival firms and becoming the foundation for inimitable value that is sustainable over time (Porter, 1985).

Creation and maintenance of intangible assets such as brand equity is becoming more important in today's intensely competitive environment. Traditional accounting methods of valuing intangibles are increasingly inadequate: the balance sheet records historical costs and expenses investments in intangibles. According to the balance sheet, "the more a company invests in its future, the less its book value is" (Rodov and Leliaert, 2002). The gap between the values recorded in the corporate balance sheet and the capital markets' valuation of the business enterprise is widening (Lev, 2001). Some recent attempts have been made to quantify and explain this difference and its components.

Brand equity is a major value driver of intangible assets, especially in consumer-based industries such as food processing (Sporleder and Louiso, 2004). As a firm asset, brand equity requires development and maintenance expenditures, but management often questions how much investment a brand needs. This question often is complicated by the ambiguity of brand value.

## **Brand Valuation**

Several different definitions of brand equity have been offered over the years. Many of them are consistent with Farquhar's (1989) definition of brand equity as the

value added by the brand to the product.<sup>1</sup> In financial reporting, accounting for brand valuation is relatively new (since the mid-1980s). The wave of brand acquisitions in the late 1980s highlighted the need for accurate brand equity valuation (Motameni and Shahrokhi, 1998; Seetharaman et. al, 2001).

Generally there are two perspectives for brand equity valuation, i.e. consumer-based and financial-based (Lassar and Sharma, 1995). The consumer-based valuation focuses on brand strength among consumers and the efficiency of market process. The financial-based valuation involves various measures of a price premium that may be attributable to quality perception on the part of the customers of the product or service. Several means are available for calculation of price premiums on branded products including the cost method, market method, income method, and the formulary method (Cravens and Guilding, 1999; cited by Seetharaman et. al, 2001). The cost method is regarded as conservative while the remaining methods recognize some element of 'future potential' in the metric. Motameni and Shahrokhi (1998) introduced the formulary valuation method by Interbrand Group in conjunction with Financial World as one of the most comprehensive approaches for brand valuation.

Each year Interbrand publishes its "Top 100 Brands" in *Business Week* magazine. The Interbrand approach may be the most popular and well-recognized method of brand valuation in the world. The Interbrand Group is a British brand-management consulting firm with offices in 35 countries. In contrast to other methods, Interbrand actually calculates dollar values for specific brand names. This dollar value is essentially the discounted cash flow attributable to the brand after stripping out operating costs, tax and other intangible earnings, i.e. a five-year weighted average of net present values obtained as the products of brand earnings and the discount rate. To merit consideration in the annual survey firms must meet three specific criteria. The brands valued must:

- derive at least one third of sales from outside their home countries,
- have brand valuation greater than \$1 billion, and
- have publicly available financial and marketing data.

Interbrand first determines the brand's overall sales and then deducts a charge for owning and maintaining the tangible assets. The income generated beyond the cost of tangible assets is due to intangible factors. Interbrand then separates earnings generated by the brand from the earnings generated by other intangibles. This is done through market research and interviews with industry executives. The final phase is to establish the risk of the brand in order to estimate an appropriate discount rate. To calculate brand strength Interbrand uses seven factors including market leadership across geographic and cultural boundaries. The risk analysis

---

<sup>1</sup> See Keller (1998, P43) for a summary of alternative definitions of brand equity.

procedures produce a discount rate that is applied to brand earnings to calculate NPV of the brand. The concern of product life cycle is included in such evaluation by using a terminal value to account for the life of the brand and in determining the discount rate of the future cash flows.

Although the Interbrand approach is a method developed by consultants, their estimates of brand equity have been studied in academic literature. Barth et al. (1998) examined the reliability of these estimates and the market's reaction to brand valuation. The authors' findings suggest that Interbrand value estimates are relevant and sufficiently robust to be reflected in market value of equity..

## **Real Options, Brand Equity, and Firm Growth**

### *Real Options Value in Brand Equity*

Real options logic provides a novel means of assessing brand value in terms of future potentials. The value of a real option is embedded in strategic flexibility when irreversible investments are made under uncertainty (Dixit and Pindyck, 1994). Such value can be simply shown in the "expanded NPV" framework as (Trigeorgis and Mason, 1987):

$$\text{Expanded NPV} = \text{Static (passive) NPV} + \text{Option Premium}$$

Traditional DCF approaches focus on static NPV while ignore the managerial flexibility of adapting future operating strategy which may bring opportunities for larger benefits and future growth. With such managerial flexibility managers can exercise the option in future desired state and not exercise otherwise. Such flexibility expands the opportunity's true value relative to passive NPV by improving its potential profit while limiting losses. Trigeorgis and Mason (1987) described this as "asymmetry" or "skewness" in the distribution of the value of the project.

Essentially the notion is that the value of decision flexibility in some future time period may be important in some situations. The idea then is to quantify the 'value' that may be associated with the flexibility. Real options logic invites the analyst to use a conceptual foundation based on the value of managerial flexibility (McGrath et al., 2004).

Dias and Ryals (2002) used a real options framework to analyze returns on brand investment. The real options method attempts to capture the value of brand extensions when estimating brand equity. They argued that traditional methods of brand valuation underestimate returns on brand investment because the focus is placed on generating incremental sales and ignores future brand extension potentials. Traditional methods of valuing brand extension possibilities rely on

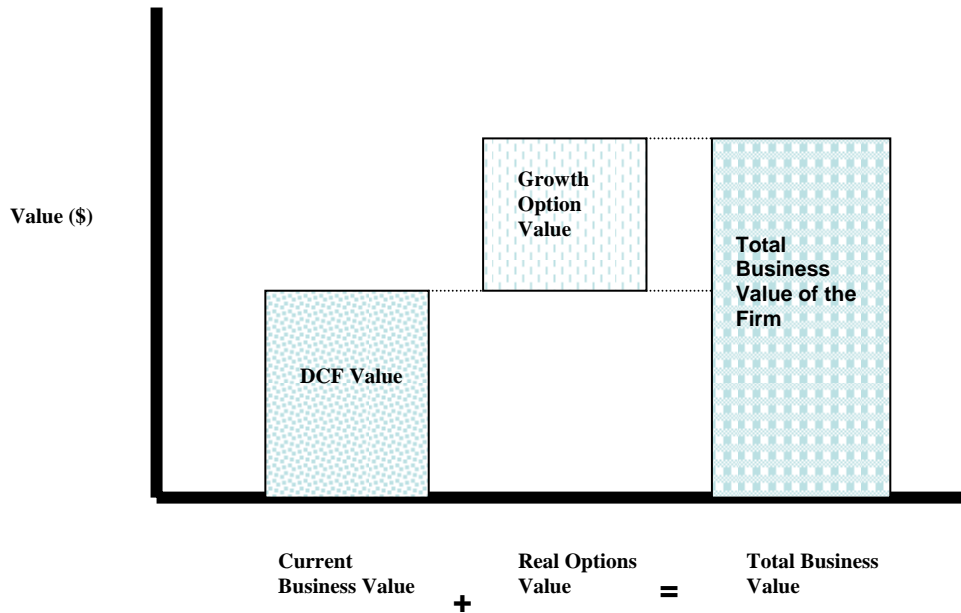
discounted cash flow (DCF) analysis, such as net present value (NPV). In contrast, real options logic emphasizes the potential managerial flexibility under uncertainty in the future. Dias and Ryals (2002) view the link between brand marketing and real options as conceptually straightforward. If brand marketing is the means by which the brand is maintained, then by continuing the brand and building brand equity, a real option is created for management through the possibility of future exploitation of brand extensions.

The analysis presented herein aims at providing empirical analysis of financial and strategic factors that may influence the growth option value of firms, especially brand equity. Brand marketing is a vehicle for building brand equity. Building brand equity also builds brand extension potentials for the future. Hence brand marketing investment is conceptually analogous to buying a call option. Subsequent exploitation of these potential brand extensions is a right but not an obligation for firm managers (Sporleder and Louiso, 2004). Moreover, the cost of building and maintaining brand equity using real options logic may substantially influence the conclusions regarding the strategic value of brand equity and the entire firm.

Product life cycle is an important issue for manufacturers and food processors. Bollen (1999) argued that standard techniques for valuing real options typically ignore product life cycle models and specifies instead a constant expected growth rate for demand or price. Myopic investment decisions may result by undervaluing the option to contract capacity and overvaluing the option to expand capacity. This consideration encourages introducing factors such as brand age and firm age into the empirical investigation to proxy product life cycle. The distinction between brand age and firm age allows the analysis to reflect the difference between brands purchased and firm acquisitions of entire businesses.

### *Growth Option Value of Firms*

The contemporary characterization of total firm business value includes assets-in-place and growth potential. The DCF of future income streams from assets-in-place accounts for a portion of current business value of a firm. An additional portion of the total business value of a firm can be characterized as the present value of firm's growth options (PVGO), Figure 1. Firms with market capitalization in excess of a reasonable estimate of the DCF of assets-in-place exhibit a positive PVGO value. Throughout this research, PVGO of a firm is defined as the difference between market value and book value of common equity divided by its market value of common equity.



**Figure 1.** Graphical Representation of the Business Value of a Firm Determined from Both Assets-in-Place and the Present Value of Growth Option (PVGO)

Source: Liu and Sporleder

Studies have shown that the value of growth options can account for a substantial portion of the firm's total value (Myers, 1977; Kester, 1984; Pindyck, 1988). PVGO becomes the metric of interest in empirically measuring the extent to which brand equity provides a real option for managers and thereby enhances firm growth in the long run. A common estimate of growth option value (GOV) of a firm is the difference between the total market value of the company's equity and the capitalized value of its current earning stream. Kester (1984) applied the following formula to GOV calculation:

$$(1) \quad GOV = VGO / V = [V - \text{Current Earnings} / \text{Discount Rate}] / V$$

Brealey and Myers (2000) defined PVGO as the option value of equity and set PVGO equal to the firm's market value of equity minus the value of the assets-in-place from divided by the firm's market value of equity to obtain the portion of equity value due to growth options.

Using a similar concept, Long et al. (2002) estimated the present value of growth options (PVGO) for a sample of manufacturing firms. As support for such measurement, Myers (1977) argued that a high market-to-book ratio should indicate a higher proportion of growth opportunities relative to assets-in-place. Folta and O'Brien (2003) also regarded market-to-book ratio as a broad proxy for growth options.

## Empirical Model

This investigation is novel because it investigates the linkage between brand value and firm's growth options value, both theoretically and empirically. Brand equity is expected to exert a positive effect on firm's growth options value. The analytic focus is on the impact of firm's brand value (BRANDV) in terms of a firm's growth option value (PVGO). These two values of BRANDV and PVGO can be regarded as jointly dependent variables and a simultaneous equations model is appropriate:

$$(2a) \text{ BRANDV}_{i,t} = F(\text{Lgbrandage}_{i,b}, \text{Advertising}_{i,t-1}, \text{Advertising}_{i,b}, \text{Salesuncert}_{i,t}, \text{Industryuncert}_{i,t} * \text{Beta}_{i,b}, \text{Advertising}_{i,t} * \text{Salesuncert}_{i,t}; \text{PVGO}_{i,t})$$

$$(2b) \text{ PVGO}_{i,t} = F(\text{Firmage-dummy}_{i,b}, \text{Sustgrowth}_{i,t}, \text{Sgnapersale}_{i,b}, \text{Leverage}_{i,b}, \text{Assets-in-place}_{i,t-1}, \text{Salesuncert}_{i,b}, \text{Industryuncert}_{i,t} * \text{Beta}_{i,b}; \text{BRANDV}_{i,t})$$

where  $i$  is the  $i$ th firm and  $t$  is the year.

System estimation allows for possible cross-equation parameter restrictions (Greene, 2003). Accordingly 3SLS is used for estimation of the linear regression parameters.

Brand value (BRANDV) is regarded as a function of advertising expense, disaggregated uncertainty indicators and the endogenous variable of the firm's growth option value (PVGO). Besides BRANDV other explanatory variables regarded as strategic drives for PVGO include measures of the individual firm's strategic factors regarding operations, investment, financing and dividends. Sustainable growth rate (Sustgrowth) is selected as a proxy for both operation and dividend factors. The leverage ratio (Leverage) is selected as a measure of equity versus debt financing. As an indicator of relative cost structure within a firm, selling, general and administrative expenditures of per dollar of sales (Sgnapersale) is chosen.

## Data Sources and Model Specification

In the empirical work reported here, the estimate of brand value is from Interbrand and is scaled by the firm's market value of common equity to account for size differences among firms across the sample. Thus, the primary data source for annual brand equity estimates by firm is obtained from the top 100 global brands calculated by Interbrand and published in *Business Week*. To be considered among this top 100 list, the brand must "have a value greater than \$1 billion, derive about a third of its earnings outside its home country, and have publicly available marketing and financial data." Thus all the sample observations are large global corporations with publicly-traded stocks.

The focus is on the food and beverage sector. A firm with more than one top global brand in the same year is associated with the highest ranked brand. Some brands

are excluded from the sample because of incomplete firm financial information. The empirical estimation reported here is based on 50 usable observations during the period of 1999 and 2003. These observations are from 12 firms in the food, beverage or tobacco sector, Table 1.

The relevant firm-specific financial data are from COMPUSTAT, Hoover's Online and Corporate Affiliations'2004 (LexisNexis). Industry-level uncertainty is proxied by the Dow Jones Sector Titans Indexes. Definitions and corresponding proxies for all variables are in Table 2.

The specified simultaneous equations system is adjusted from Liu and Sporleder (2005). The parameters are estimated by 3SLS regression using unbalanced panel data of 50 observations during the sample period of 1999-2003. Lag structures for advertising expense were investigated. However, since there is high positive correlation between the advertising expense of current and previous years for the same firm, only the current year is included in the finalized model. Brand age also is excluded from the finalized model because of high correlation with advertising expense.

## **Results**

Among the 12 top global brands in food sector, most are related with either food or consumer product retailing, Table 1. All companies with top brands in the sample are headquartered in the United States except DANONE, a French company. These top brands all represent more than \$1 billion in brand equity value. Over one-third have valuation in excess of \$10 billion. Coca-Cola maintains the greatest brand equity valuation of any other brand globally. The brand equity in Coca-Cola is estimated at around \$70 billion (during the sample period) which is more than three times the valuation of the second highest brand value, McDonald's.

Of course, brand equity can either increase or decrease over time. There are dynamic aspects to the relative rankings of these brand value as calculated by Interbrand. Pepsi has enjoyed a significant increase in brand equity, nearly doubling in 2003 compared to previous years. Of the 12 top food and beverage brands from 2002 to 2003, one-fourth decreased in value. This suggests that attaining a high level of brand valuation is no guarantee of continued brand value appreciation.



**Table 2: Conceptual Variables and Proxies**

Conceptual Variable	Calculation	Data Source	Variable Notation
Amount of Brand Equity for an individual brand per \$ of the firm's capitalization	Brand value as measured by Interbrand divided by the entire firm's market capitalization	Interbrand, and CompuStat	<i>BRANDV</i>
Growth option value of the firm	(Market value of common equity – book value of common equity) / Market value of common equity	CompuStat	<i>PVGO</i>
Brand age	ln (Brand age)	Hoover's online <sup>2</sup>	<i>Lgbrandage</i>
Firm age dummy	=1 if firm founded earlier than 1940 (mean of the sample founded year); =0 otherwise	Corporate affiliations	<i>Firm age dummy</i>
Firm-level sales growth uncertainty	standard deviation of firm's net sales growth rate of past five years	CompuStat	<i>Salesuncert</i>
Industry level uncertainty	Standard deviation of industry returns of past five years	Dow Jones Indexes	<i>Industryuncert</i>
Sensitivity of firm's return to the market return	Linear regression of $r(\text{firm})_{it} = \alpha_i + \beta_i r(\text{industry})_{it} + e_{it}$ , where r is monthly return.	CRSP and Dow Jones Sector Titans Indexes	<i>Beta</i>
Advertising expenditure per \$ of sale	ln [(Advertisement expense) / (Firm's total sales)]	CompuStat	<i>Advertising</i>
Firm's assets-in-place	ln (firm's total assets of the previous year)	Corporate affiliations	<i>Assets-in-place</i>
Leverage ratio	(Long term debt + Debt in current liabilities) / Firm's total assets	CompuStat	<i>Leverage</i>
Marketing and overhead expense per \$ of sales	(Selling, general, and administrative expenses) / Firm's total sales	CompuStat	<i>Sgnapersale</i>
Sustainable growth rate	ROE × (reinvestment earnings/net income)	CompuStat	<i>Sustgrowth</i>

<sup>2</sup> Brand age is approximated through the firm-specific history information provided in Hoover's Online. Each brand age is calculated as the number of years since the brand was first introduced.

The relative importance of a brand’s value is captured in the BRANDV variable calculated as the ratio of brand value over the firm’s market capitalization (market value of total common stock). About one-third of the sample firms have BRANDV greater than 0.5. This means that for the largest brand valuations, the brand value alone accounts for over one-half of the firm’s market capitalization. On average, about 38% of a food firm’s market capitalization is accounted for by brand equity.

### **Brand Equity Elasticity Estimates**

**Table 3:** 3SLS Parameter Estimates for Simultaneous Equation System Model (using sample among food, beverage and tobacco firms)

Variable	Estimates	
	BRANDV	PVGO
Constant	-0.51 (0.689)	0.75 (0.210)***
Firmage-dummy <sub>i,t</sub>		0.13 (0.065)*
Advertising <sub>i,t</sub>	-0.31 (0.142)**	
Assets-in-place <sub>i,t-1</sub>		-0.05 (0.020)*
Sustgrowth <sub>i,t</sub>		-0.47 (1.156)
Sgnapersale <sub>i,t</sub>		-0.19 (0.194)
Leverage <sub>i,t</sub>		0.40 (0.267)
Salesuncert <sub>i,t</sub>	16.18 (7.542)**	1.46 (0.860)*
Industryuncert <sub>t</sub> * Beta <sub>i</sub>	-0.004 (0.002)**	0.003 (0.001)**
Advertising <sub>i,t</sub> * Salesuncert <sub>i,t</sub>	6.24 (2.613)**	
BRANDV <sub>i,t</sub>		0.57 (0.326)*
PVGO <sub>i,t</sub>	0.41 (0.682)	
System weighted R <sup>2</sup>		0.53
System weighted MSE		1.07
Number of observations		50

\* p<0.10, \*\*p<0.03, \*\*\*p<0.01

Brand equity (BRANDV) is expected to have a positive effect on a firm’s growth option value. As shown in the regression results (Table 3), the coefficient of BRANDV is positive and therefore consistent with a priori expectation. For the effect on PVGO, the other variables with significant and positive coefficients are the firm age dummy, sales uncertainty, and industry-level uncertainty. Assets-in-place is identified with a significant and negative coefficient. This indicator implies that

larger firms do not have proportionately the same growth option potential as relatively smaller firms<sup>3</sup>.

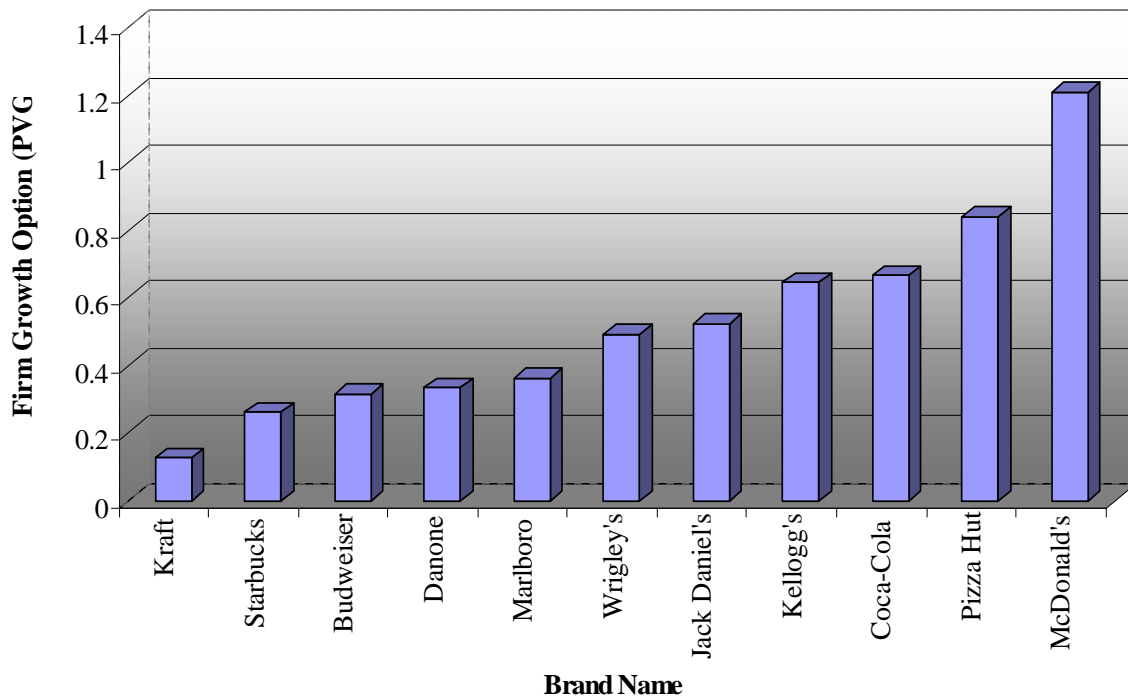
A unique feature of this empirical research is the estimation of brand elasticities for individual firms as well as across all food and beverage firms taken as a group. Other elasticities for PVGO also are estimated which include assets-in-place and sales uncertainty with respect to PVGO of food and beverage firms, Table 4.

For all food and beverage firms, taken as an average, brand equity elasticity with respect to PVGO is 0.498. This elasticity estimate is comparable with the elasticity of assets-in-place and is larger than that of sales uncertainty elasticity. The brand equity elasticity indicates that for each 10% change in the brand equity (BRANDV), the firm's growth option value (PVGO) changes 4.98% in the same direction. This is an interesting estimate rich with implications. The implication of the elasticity is that brand equity is not only a saleable asset in a firm's arsenal of intangibles, but that this particular intangible actually adds significantly to firm value or market capitalization over time. The further implication is that brand equity building strategies should not be evaluated by managers as simply a 'controllable expense item' in the sense of expenditure items such as advertising and promotion. The PVGO and real options approach to brand equity truly implies that brand equity building strategies are long-term investments for the stakeholders of the firm, broader than mere expense items.

Relative brand equity elasticities for selected individual brands contain interesting implications as well, Figure 2. Among the 12 individual brand elasticities that are estimated, the estimates range from 0.067 (Pepsi) to 0.651 (McDonald's). As the value of firm's growth option value increases the brand elasticity also increases. The magnitude of the disparity between the lowest and highest brand equity elasticities is surprising. Note that the McDonald's brand elasticity is roughly 10 times larger than the Pepsi brand elasticity. This implies that substantial variation across firms would be expected in the elasticities, even across firms within the same economic sector.

---

<sup>3</sup> However, remember that the sample of firms used for the calculations presented in this research are all very large global firms, as required by Interbrand in order for that brand to be included in the brand equity calculation that Interbrand performs annually. So, 'relatively small' in this instance still means that the corporation that owns the brand is large by most standards.



**Figure2:** Brand Equity Elasticity Estimates for Selected Food Firms

The average assets-in-place elasticity with respect to PVGO is -0.561, which suggests that for each 10% change in firm size, the firm's growth option value (PVGO) changes 5.61% in the opposite direction. The firm-specific estimates range from -0.423 (Wrigley) to -0.960 (Kraft), which present a less variety than brand equity elasticity. Another indication is that firm's growth strategies may vary according to the different impacts of key drivers. McDonald's sees significant firm growth from both brand building and the level of assets-in-place, while Pepsi may have focused more on the latter

## Conclusions

Brand names and brand equity are recognized as important intangible assets among firm managers in the global food supply chain. This analysis investigates the long run potential of brand equity among food processors actually creating real options for a firm's management. The empirical analysis views brand equity among food processors as a drive for firm's growth option value and empirically tests other selected factors conceptually associated with firm growth. Results indicate that brand equity has a positive effect on the growth option value of the firm, after accounting for other major drivers of firm growth.

Brand equity elasticity is estimated with respect to firm's growth value for both the industry- and firm-level. For all food and beverage firms, the average brand equity

elasticity with respect to PVGO is 0.498. As the value of firm's growth option value goes up, the brand elasticity also increases. The implication of the elasticity is that brand equity is not only a saleable asset in a firm's arsenal of intangibles, but that this particular intangible actually adds significantly to firm value or market capitalization over time. The wide range of brand elasticity with respect to firm's growth option value indicates substantial variation across firms, even within the same business sector. This further reflects the different focus and/or impacts of firm's investment strategies on growth.

One major implication of the analysis is that managers of food firms should evaluate the efficacy of brand equity building strategies in terms of the contribution brand equity makes to the firm's growth option value. Clearly, strategies that build brand equity should be viewed and evaluated for their real options value to the firm. The evidence suggests that categorizing advertising expenditures solely as an expense item may be too narrow from a strategic viewpoint. The PVGO and real options approach to brand equity truly implies that brand equity building strategies are long-term investments for the stakeholders of the firm, broader than mere expense items.

## References

- Barth, M.E. et al. (1998). Brand Values and Capital Market Valuation. *Review of Accounting Studies*, 3, 41-68.
- Bollen, Nicolas P.B. (1999). Real Options and Product Life Cycles. *Management Science*, 45 (5), 670-684.
- Brealey, R.A. and S.C. Myers (2000). *Principles of Corporate Finance*. New York: The McGraw-Hill Companies.
- CompuStat Financial Data, Standard & Poors, a division of McGraw Hill, 1999-2003.
- Corporate Affiliations'2004 (LexisNexis), New Providence, NJ. Available at <http://www.corporateaffiliations.com>.
- Cravens, K.S. and C. Guilding (1999). Strategic brand valuation: a cross-functional perspective. *Business Horizons*, 42 (4), 53-62.
- Dias, S. and L. Ryals (2002). Options Theory and Options Thinking in Valuing Returns on Brand Investments and Brand Extensions. *Journal of Product & Brand Management*, 11 (2), 115-128.

- Dixit, A.K., and R.S. Pindyck (1994). *Investment Under Uncertainty*. Princeton: Princeton University Press.
- Dow Jones Sector Titans Indexes, available at: <http://www.djindexes.com/mdsidx/index.cfm?event=showSectorTitansIndexData>
- Farquhar, P.H. (1989). Managing Brand Equity. *Marketing Research*, 1, 24-33.
- Folta, T.B. and J.P. O'Brien (2003). Entry in the presence of dueling options. *Strategic Management Journal*, 25 (2), 121-138.
- Greene, W.H. (2003). *Econometric Analysis*, Chapter 14. Pearson Education, Inc., Upper Saddle River, New Jersey.
- Hoover's Online, available at <http://www.hoovers.com>.
- Interbrand Group, Brand Equity Estimates (1999-2003), London, England.
- Keller, K.L. (1998). *Strategic Brand Management*. New Jersey: Prentice-Hall.
- Kester, W.C. (1984). Today's Options for Tomorrow's Growth. *Harvard Business Review*, March/April, 153-60.
- Lassar, W., B. Mittal and A. Sharma (1995). Measuring consumer-based Brand equity. *Journal of Consumer Marketing*, 12 (4), 11-19.
- Lev, Baruch. *Intangibles: Management, Measurement, and Reporting* (Washington, DC: Brookings Institution Press, 2001).
- Liu, J. and T.L. Sporleder (2005). Assessing the Growth Option Value of Brand Equity among Food Processors. The *International Food and Agribusiness Association (IAMA)* Annual Conference, Chicago, IL (June 25-28).
- Long, M.S., J.K. Wald and J. Zhang (2002). A Cross-sectional Analysis of Firm Growth Options. Rutgers Business School Working Paper, Rutgers University (July).
- McGrath, R.G., W.J. Ferrier, and A.L. Mendelow (2004). Real Options and Engines of Choice and Heterogeneity. *Academy of Management Review*, 29 (1), 86-101.
- Miller, M.H. and F. Modigliani (1961). Dividend Policy, Growth, and the Valuation of Shares. *Journal of Business*, 34, 411-433.
- Motameni, R. and M. Shahrokhi (1998). Brand Equity Valuation: A Global Perspective. *J. of Product and Brand Manage*, 7, 275-290.

- Myers, S. (1977). Determinants of Corporate Borrowing. *Journal of Financial Economics*, 5, 147-176.
- Pindyck, R.S. (1998). Irreversible Commitment, Capacity Choice, and the Value of the Firm. *American Economic Review*, 78, 967-985.
- Porter, M. E. *Competitive Advantage: Creating and Sustaining Superior Performance* (New York, N.Y.: The Free Press, 1985).
- Rodov, I. and P. Leliaert (2002). FiMIAM: Financial Method of Intangible Assets Measurement. *Journal of Intellectual Capital*, 3(3): 323-336.
- Seetharaman, A., et. al (2001). A Conceptual Study on Brand Valuation. *Journal of Product & Brand Management*, 10 (4), 243-256.
- Sporleder, T.L. and J.C. Louiso (2004). Brand Equity in the Global Food System. *Dynamics in Chains and Networks*, H.J. Bremmers, S.W.F. Omta, J.H. Trienekens, E.F.M. Wubben (editors). Wageningen Academic Publishers, Wageningen, the Netherlands, 465-471.
- Srinivasan, V., C.S. Park and D.R. Chang (2001). EQUITYMAP: Measurement, Analysis, and Prediction of Brand Equity and its Sources. Research Paper series No.1685, Graduate School of Business, Stanford University.
- Trigeorgis, L., and S.P. Mason (1987). Valuing Managerial Flexibility. *Midland Corporate Finance Journal* (Spring), 14-21.

## Appendix A:

**Table 1: World's Most Valuable Brands in Food, Beverage & Tobacco Sector**

		Brand Value (Million\$)							
	Brand	2003	2002	2001	2000	1999	Industry	Parent Company	Country of Origin
1	COCA-COLA	70453	69640	68950	72537	83845	Food & Beverages	Coca-cola	USA
2	McDONALD'S	24699	26380	25290	27859	26231	Retail	McDonald's	USA
3	MARLBORO	22183	24150	22050	22111	21048	Tobacco	Altria Group	USA
4	BUDWEISER	11894	11350	10840	10685	8510	Alcohol	Anheuser-Busch	USA
5	PEPSI	11777	6390	6210	6637	5932	Food & Beverages	Pepsico	USA
6	KELLOGG'S	7438	7190	7010	7357	7052	Food & Beverages	Kellogg's	USA
7	PIZZA HUT	5312	6050	6000	N/A	N/A	Retail	YUM Brands Inc	USA
8	WRIGLEY'S	5057	4750	4530	4324	4404	Food & Beverages	Wrigley's	USA
9	DANONE	4237	4050	N/A	N/A	N/A	Food & Beverages	Group Danone SA	France
10	KRAFT	4171	4080	4030	N/A	N/A	Food	Kraft Foods Inc	USA
11	STARBUCKS	2136	1960	1760	1330	N/A	Food & Retail	Starbucks	USA
12	JACK DANIEL'S	N/A	1580	1580	1480	N/A	Alcohol	Brown Forman	USA



## Appendix B:

**Table 4: Average PVGO and BRANDV; Elasticity for Brand Equity, Firm Size and Sales Uncertainty (Large Food and Beverage Firms with Top Global Brands)**

Brand	Firm	Average BRANDV	Average PVGO	Derived Elasticity Estimate with Respect to PVGO		
		(1999-2003)	(1999-2003)	Brand Equity	Assets-in-place	Sales Uncertainty
KRAFT	Kraft Foods Inc.	0.068	0.568	0.068	-0.960	0.494
PEPSI	Pepsico	0.103	0.877	0.067	-0.566	0.302
STARBUCKS	Starbucks	0.203	0.824	0.141	-0.451	0.101
DANONE	Group Danone SA	0.220	0.698	0.180	-0.517	0.202
MARLBORO	Altria Group	0.267	0.780	0.195	-0.718	0.121
BUDWEISER	Anheuser-Busch	0.270	0.908	0.169	-0.608	0.043
JACK DANIEL'S	Brown-Forman	0.365	0.740	0.281	-0.511	0.039
WRIGLEY'S	WRIGLEY JR	0.409	0.879	0.265	-0.423	0.061
KELLOGG'S	Kellogg	0.564	0.925	0.348	-0.476	0.143
COCA-COLA	Coca-Cola	0.572	0.911	0.358	-0.550	0.055
PIZZA HUT	YUM! Brands	0.738	0.930	0.452	-0.454	0.119
McDONALD'S	McDonald's	0.788	0.690	0.651	-0.724	0.053
Average Industry Level		0.381	0.811	0.498	-0.561	0.197