Promoting a local brand: Assessing the Economic Benefits of the Texas Superstar® and Earth-Kind® Promotion on Place (POP) Program

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Introduction

Fresh vegetables, fruits and ornamental plants were usually marketed as generic products. Even though the development of a brand name for consumers is extremely expensive (Bunte, 2009), branding has gained increasing recognition as a marketing instrument to differentiate products in the horticultural industry (Koelemeijer et al., 2003). Most agricultural brands enable producers or firms to distinguish themselves from their competitors in the chain. Once a brand is established it provides a differentiated product for the consumer and increases the added value for the producer (Bagnara, 1996). Brands usually aim to meet consumers' desire for variety, quality and service, and allow farmers to retain higher profit margins (Hayes and Lence, 2002).

Many horticultural brands have been established in recent years around the world. According to Bunte (2009), the Dutch horticulture sector has developed brands during the past decade such as Tasty Tom, Les Meilleurs (strawberries), Salanova (lettuce), Tinkerbell (sweet peppers) and Koppert Cress. In the United States, horticultural brands currently in the market include Sygenta flowers, Proven Winners®, Novalis® Plants that Work®, Garden Splendor®, among others.

Moreover, regional branding has allowed consumers to associate ornamental products to a particular geographical region (Lillywhite et al., 2005). Regional branding of ornamentals in the United States include state-sponsored brands such as Oklahoma Proven, Louisiana Select, Oregon Grown, Florida Plants of the Year, Texas Superstar® and Earth-Kind®. The development of these state-sponsored programs is of special interest given the current popularity of the local movement.

The Texas Superstar® and Earth-Kind® programs are two state-sponsored plant promotion programs that have been established by the Texas A&M University Agricultural Program, in conjunction with other state and private collaborators, as an effort to stimulate consumer demand and increase the industry's profitability.

The Texas A&M University Agricultural Program started developing the Texas Superstar® program in 1989 and the Earth-Kind® rose program in 1996. Texas Superstar® is an initiative carried out by the Coordinated Educational and Marketing Assistance Program (CEMAP), a group composed of horticultural scientists and extension specialists. These specialists identify potential plant material that goes through an extensive evaluation process to assess heat, drought, disease and insect tolerance and designate plants that demonstrate superior performance as Texas Superstars® (Mackay et al. 2001). Examples of Texas Superstars that have been promoted in the CEMAP program are new color ranges of Texas Bluebonnets (*Lupinus texensis*), roses that can be grown in acidic, neutral, or alkaline soils such as Belinda's Dream Rose, a number of vegetables as the hybrid Tomato 444 (*Lycopersicon esculentum*) which is resistant to the spotted wilt virus, and woody plants including Mexican Firebush (*Hamelia patens*) and Satsuma Orange (*Citrus reticulata*). Additionally, specialists created the Earth-Kind® Rose Program. Since roses are considered in horticulture one of the most difficult to grow garden flowers, the program was defined by a number of experts as probably the most significant development in rose horticulture (Hammond 2005). In the Earth-Kind® Rose Program, research is conducted to identify cultivars of landscape roses which are attractive, heat and drought tolerant, tolerant of poorly aerated, highly alkaline clay soils,

and so tolerant/resistant to disease and insect problems that pesticide applications are seldom required (Arnold et al. 2002).

In 2010, the Texas Department of Agriculture (TDA) invested funds in developing promotional materials to distribute to producers who carry Texas Superstar® and Earth-Kind® products in their operations. The promotional materials distributed consisted of plant tags as a form of Promotion on Place (POP) and included growers and retailers in the Texas area who work closely with TDA. This paper aims to evaluate consumer's awareness and willingness-to-pay (WTP) for Texas Superstar® and Earth-Kind® after the POP program was performed by the Texas Department of Agriculture (TDA). A baseline survey conducted prior to the POP program is used and the results are compared with a follow-up survey conducted after the program to identify any changes in consumer awareness and WTP for these two brands. Furthermore, consumer's behavioral and socio-demographic characteristics that are more likely to influence WTP for Texas Superstar® and Earth-Kind® are identified.

Literature Review

A measure that has been widely used to analyze consumer behavior to differentiated agricultural products is consumer's willingness-to-pay (WTP). According to Wertenbroch and Skiera (2002) economists and marketing researchers rely on measures of consumers' WTP in estimating demand for private and public goods and in designing optimal price schedules given that this measure is the best indicator of individual preferences available to specialists.

Bagnara (1996) evaluated consumers' WTP for a brand that guaranteed peaches produced by integrated pest management techniques and found that consumers were

more willing to penalize unbranded peaches than to pay for a branded product. From a marketing viewpoint, the model showed a limited possibility for increasing the added value of peaches but a high potential for enlarging the marketing margin through proper market segmentation and communication. Carpio and Isengildina-Massa (2010) investigated the potential economic impact of the locally grown campaign in South Carolina and found that the first season of the promotion campaign increased consumer WTP for produce by 3.4%. The authors collected consumers WTP before and after the advertisement campaign and interpreted the change in WTP (ΔWTP) as the vertical shift in the consumer demand due to the promotion campaign in order to asses the campaign's effectiveness.

In the context of ornamentals, Yue et al. (2009) found that consumers' WTP for plants decreases when plants are labeled as invasive and increases when plants are labeled as native. They found that consumers' sociodemographics and attitudes significantly alter consumers' WTP for native and invasive attributes. Also, the outcome of the baseline model developed prior to the POP program on consumer's awareness and WTP for Texas Superstar® and Earth-Kind® suggested that consumers who purchase ornamental plants for self-consumption (versus gifts) are willing to pay a discounted price for Texas Superstar® and Earth-Kind®, and those who were previously aware of the brands are willing to pay a price premium. Results of this previous study showed that self-consumption purposes decrease the average consumers' willingness-to-pay for Texas Superstar® plants compared to regular plants around 16% and for Earth-Kind® plants around 6%. The increase in WTP as consequence of brand awareness was a close estimate for the two programs, with an increase of 11% on the average WTP as a result of

Texas Superstar® awareness and an increase of 10% on the average WTP as a result of Earth-Kind® awareness (Collart et al., 2010).

Data and Methods

Data regarding consumers' perceptions of branding efforts and WTP for Texas Superstar® and Earth-Kind® were obtained through two electronic mail surveys performed to a representative sample of the Texas population. The first survey was conducted in July of 2008, before the POP program. From the total sample of 800 consumers approximately 31% were actual consumers of the ornamental industry's products, lowering the final number of usable responses to 274 observations. The second survey was conducted in August of 2010 after the program was finished and it consisted of a total of 526 observations. The responses from both surveys were pooled and used to develop two models intended to explain the change in WTP for the Texas Superstar® and Earth-Kind® programs. The models explain the determinants of Texas consumer's for branded ornamental plants. Specifically, we develop two models where the dependent variable is the mean WTP for the brand, and it is a function of behavioral variables, brand awareness, consumer demographics and the program dummy.

The dependent variable is defined in terms of the percentage price premium the consumer is willing to pay for the branded product compared to a regular plant. Explanatory variables include the purpose of the purchase (PP), regularity of purchase (REGU), post-program dummy (POST), brand awareness for Texas Superstar (TSAW) or Earth-Kind (EKAW), and several demographic characteristics, including age, gender, marital status, income, ethnicity, education, and region (see Table 1). The purpose of the purchase variable identifies the use of the ornamental plants: self consumption or gifts.

The variable regularity is a discrete variable that identifies habitual buyers (purchase ornamental products weekly or monthly), versus non-habitual buyers (purchase ornamental products once a year or in special occasions only). The mean WTP for brand *i* can be written as:

$$WTP_i = \beta_0 + \beta_1 AGE2 + \beta_2 AGE3 + \beta_3 AGE4 + \beta_4 FEMALE + \beta_5 MARRIED + \beta_6 INC2 + \beta_7 ET2 + \beta_8 ET3 + \beta_9 EDU2 + \beta_{10} EDU3 + \beta_{11} PP + \beta_{12} REGU + \beta_{13} POST + \beta_{14} AW + \beta_{15} REG2 + \beta_{16} REG3 + \varepsilon_i \quad (1)$$

where all variables used in the model and their definition are presented in Table 1.

Because the dependent variable in our regression model equation has a lower limit (i.e. zero), conventional multiple regression analysis is not an appropriate technique to be used (Lung-Fei and Maddala, 1985). In order to account for this truncation on the data set the Tobit model can be specified as follows (Greene, 2000):

$$f_i^* = x_i'\beta + \varepsilon_i, \quad (2)$$

where x_i' is the (1 × K) vector of explanatory variables and $\varepsilon_i \sim N(0,\sigma^2)$ and it is independent of other errors. Thus for any household the willingness-to-pay (WTP) model would take the form:

$$f_i = f_i^* \qquad \text{if } f_i^* > 0 \quad (3)$$

$$f_i = 0 \qquad \text{if } f_i^* \le 0.$$

From the total number of observations N in the sample, the number of observations can be divided into two groups; one for which $f_i = 0$, denoted as N_0; and another for the number of observations for which $f_i > 0$, denoted as N_1. The N_1 sample observations are complete observations; hence one can use least squares estimators to

estimate β. The problem is that leaving out of the analysis the N_0 observations for which $f_i = 0$ causes this estimator to be biased and inconsistent

In order to estimate the parameters β and σ^2 consistently, maximum likelihood estimation (MLE) procedures can be used. The likelihood function of the sample has a component for the observations that are positive, and one for the observations that are zero. If we define the product of the observations over the zero lower limit level to be Π_0 and the product over the positive observations to be Π_1, the likelihood function of the Tobit model is given by:

$$\ell = \prod_0 (1 - \Phi_i) \prod_1 (2\pi\sigma^2)^{-\frac{1}{2}} \exp\left\{-(f_i - x_i'\beta)^2 / 2\sigma^2\right\} \quad (4)$$

and the corresponding log-likelihood function is:

$$L = \ln \ell = \sum_0 \ln(1 - \Phi_i) - (N_1/2)\ln(2\pi) - (N_1/2)\ln\sigma^2 - \sum_1 (f_i - x_i'\beta)^2 / 2\sigma^2 \quad (5)$$

The parameters for the willingness-to-pay (WTP) models were estimated using Time Series Processor (TSP 4.5). The estimation procedure uses the analytic first order conditions ($\frac{\partial L}{\partial \beta}$ and $\frac{\partial L}{\partial \sigma^2}$) derived from Equation 5 to obtain MLE via the Newton-Raphson algorithm. The starting values for the parameters are obtained from a regression on the observations with positive f values.

Results and Discussion

The survey samples were a fair representation of the Texas' population based on socio-demographic characteristics, including marital status, gender, ethnicity, and income (see Table 2). In the consumer survey of 2010, about 70% of respondents were married compared with 54% of the population in Texas. The percentage of females in the sample

was 67% versus 50% for Texas; and from the total number of respondents 58% had an income of more than $50,000 compared to 47% of Texas' population. The ethnical distribution of the sample was similar to the U.S. Census Bureau data and the highest degree obtained from 84% of the sample population was a bachelor's degree compared with 92% of Texas' population.

In 2010, most respondents (85%) reported to be non-habitual ornamental buyers or purchasers of ornamental plants during special calendar buying occasions only. Most ornamental products in Texas were purchased for self-consumption purposes, with 88% of respondents declaring the reason of the purchase was self-consumption. The preferred outlets to purchase ornamental products were garden centers (71%), nurseries (43%), chain stores (28%), and supermarkets (20%). Respondents were also asked to rate the importance of several aspects in the purchase decision including drought tolerance (3.94/5), vibrant colors (3.92/5), low-care demand (3.88/5), season (3.78/5), price (3.69/5), guaranteed growth (3.56/5), light demand (3.56/5), and organic (2.69/5).

Profiles of the Texas consumers' behavioral and socio-demographic characteristics that are more likely to influence their WTP for Texas Superstar® and Earth-Kind® were identified. The parameter estimates for the Texas Superstar® WTP and Earth-Kind® WTP models are presented in Tables 3 and 4, respectively. In the Texas Superstar® WTP model, the strong significance of the sigma parameter suggests that for the data truncation, the lower limit level of zero can not be ignored and the estimation method must deal with the asymptotic distribution of the data. This parameter refers to the estimated standard deviation of the residual. In this model, 342 out of 390, or 87.7% of the usable observations were positive. The sign of the parameters can be interpreted as

an increase (positive), or decrease (negative) in the mean WTP. The marginal effects represent the change in the mean WTP for an additional unit or the presence of the variable, depending on the nature of the variable (i.e. continuous or discrete). Since most of the variables in the model are dummies, marginal effects are interpreted as the change in the mean WTP associated to that dummy variable.

Results in Table 3 show that there was no statistical significant influence of younger age groups. AGE3 (40-55 years old) and AGE4 (more than 55 years old) both decrease the WTP by 5%. One of the reasons why older households have lower WTP for ornamental products in the market may be because they tend to have landscaping services performed by contractors and actually do not deal with buying ornamental plants as often.

Ethnicity had no statistically significant effects on WTP for Texas Superstar®. The two variables with the highest effects on WTP were purpose of the purchase (PP) and brand awareness (TSAW). When the purpose of the purchase was for self-use, the model showed a decrease in WTP of 7%. Consumers aware of the Texas Superstar® program are willing to pay a 10% price premium for Texas Superstar® certified plants compared to regular plants. Regularity had no statistically significant effects on WTP for Texas Superstar®. Also, we did not find any statistically significant differences in WTP among Texas regions.

The percentages of consumers aware of Texas Superstar® were 12% before the POP program and 19% after the program. Given these percentages, the average effect of the program on the mean WTP for both periods was calculated by multiplying the marginal effect corresponding to brand awareness (TSAW) times the share of the population that is aware (an average for both periods). Thus, the average effect of the

program on mean WTP for Texas Superstar® was estimated at 1.6%. In other words, without the program the WTP for Texas Superstar® products would have been 1.6% lower. The effect of the program on Texas Superstar® WTP between period 1 and 2 was calculated as the difference between the percentage of people aware in the second period and the percentage of people aware in the first period (i.e. 7%). Hence the effect on the mean WTP of the program between periods 1 and 2 was calculated by multiplying the marginal effect corresponding to brand awareness (TSAW) times the difference in average brand awareness between periods. The difference in the effect of the program on periods 1 and 2 was calculated at 0.7%.

Similar to Texas Superstar® model, the sigma parameter was strongly significant in the Earth-Kind® WTP model, suggesting that the lower limit level of zero can not be ignored and the appropriate estimation method must account for the asymptotic distribution of the data (Table 4). In this model, 333 out of 400, or 83.2% of the usable observations were positive. Again, there was no statistical significant influence of younger age groups. AGE3 (40-55 years old) and AGE4 (more than 55 years old) both were strongly significant at a 1% level and both decrease WTP for Earth-Kind®. For individuals of 40-55 years of age, WTP was reduced by 8.4%, while individuals older than 55 had a decrease of 9.7% in WTP, which might be explained by the increasing participation of older age groups in landscaping contracts. In addition, if a respondent was a female, then the WTP was increased by 7.3% (price premium).

The variable with the highest effect on WTP for Earth-Kind® was awareness (EKAW). Consumer that were aware of the Earth-Kind® program were willing to pay 19% price premium for Earth Kind® roses compared to regular roses. Ethnicity, regularity

of purchase, and education had no statistically significant effects on the WTP for Earth-Kind®. No statistically significant differences in WTP among Texas regions were found.

The percentages of consumers aware of Earth-Kind® were 14% before the POP program and 17% after the program. Given these percentages, the average effect of the program on the mean WTP for Earth-Kind® for both periods was estimated at 3%. That is, without the program the WTP for Texas Superstar® products would have been 3% lower. Finally, the effect of the program on Earth-Kind® WTP between period 1 and 2 was calculated using the difference between the percentage of people aware in the second period (17%) and the percentage of people aware in the first period (14%). Hence the effect on the mean WTP of the program between periods 1 and 2 was calculated at 0.6%.

Summary and Conclusions

Branding, only when combined with effective marketing, can help agricultural producers develop awareness and create consumer loyalty, increasing price premiums, which can lead to long-term and sustainable competitive advantages. Understanding how promotion programs influence branded ornamental plants is essential to understanding ornamental demand. This study used an electronic survey conducted in Texas to study the main factors affecting WTP for Texas Superstar® and Earth-Kind® products. While we found several differences in demographic characteristics of respondents, the largest effects for branded ornamental plant's WTP were determined by consumer age and brand awareness. Brand awareness increased WTP by 10% for Texas Superstar® and 19% for Earth-Kind®. Older age groups (AGE3: 40-55 years, and AGE4: 55 or older) decreased the consumer's WTP for Texas Superstar® by 5%. In Earth-Kind®, WTP is decreased by 8.5% in groups of 40-55 years old and by 9.7% in groups of 55 years or older. We found

no statistically significant effects of ethnicity, education, or regional differences in the state of Texas on WTP for these programs.

The percentages of consumers aware of Texas Superstar® were 12% before the POP program and 19% after the program. The average effect of the program on the mean WTP for both periods was calculated at 1.6%, meaning that without the program the WTP for Texas Superstar® products would have been 1.6% less. The effect of the program on Texas Superstar® WTP between period 1 and 2 was calculated at 0.7%. The percentages of consumers aware of Earth-Kind® were 14% before the POP program and 17% after the program. The average effect of the program on the mean WTP for Earth-Kind® for both periods was estimated at 3%, that is, without the program the WTP for Texas Superstar® products would have been 3% less. The effect of the program on Earth-Kind® WTP between period 1 and 2 was calculated at 0.6%.

The fact that the percentage of awareness on the second survey is higher for both brands is an indication that the program is reaching out to more people. An important policy implication to emphasize is that even though the percentage effects of the POP program on consumers WTP might seem small, they could translate into considerable market impacts for the ornamental industry. For instance, Carpio and Isengildina-Massa (2010) estimated that an increase in mean WTP of 3.4% after the first season of the locally grown campaign in South Carolina increased producer surplus by $3.09 million.

These results attempted to assess the effectiveness of the Texas Superstar® and Earth-Kind® plant promotion programs in terms of consumer's awareness, WTP, and the economic impact of their most recent marketing program. The results identified a profile

of ornamental consumers who are willing to pay a price premium for branded ornamental plants in Texas who should be targeted by future marketing efforts.

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Table 1. Description of Buying Frequency Models Variables.

Variable	Description
Socio-demographic characteristics	
AGE2	Age between 25-39 years old (= 1 if true and 0 otherwise)
AGE3	Age between 40-55 years old (= 1 if true and 0 otherwise)
AGE4	More than 55 years old (= 1 if true and 0 otherwise)
FEMALE	If gender is a female (= 1 if true and 0 otherwise)
MARRIED	Married marital status (= 1 if true and 0 otherwise)
INC1	Income level (= 1 if income below $50,000 and 0 otherwise)
INC2	Income level (=1 if income equal or above $50,000 and 0 otherwise)
ET2	Ethnicity (=1 if ethnicity is Hispanic, and 0 otherwise)
ET3	Ethnicity (=1 if ethnicity is other, and 0 otherwise)
EDU2	Education level (=1 if college degree, and 0 otherwise)
EDU3	Education level (=1 if graduate school, and 0 otherwise)
Consumer habits	
REGU	Regularity of purchase (= 1 if weekly or monthly and 0 otherwise)
PP	Purpose of the purchase (= 1 if self consumption and 0 otherwise)
POST	Post-program (=1 if Post-promotional campaign and 0 otherwise)
TSAW	Texas Superstar® awareness (= 1 if true and 0 otherwise)
EKAW	Earth-Kind® awareness (= 1 if true and 0 otherwise)
Region	
REG2	Region: Central Texas (= 1 if true and 0 otherwise)
REG3	Region: South Texas (= 1 if true and 0 otherwise)
Dummy variables base levels	
AGE1	Age group of under 25 years
INC1	Income group of under $50,000
ET1	Ethnicity is Caucasian
EDU1	Education level is high school or less
REG1	Region is north

Table 2. Sample Representativeness of the Texas Population for Survey of 2008 and 2010

Demographic variables		Survey Data 2008		Survey Data 2010		Census
		Frequency	Percentage	Frequency	Percentage	
Marital status	Married	163	60	366	70	53.5
	Single	109	40	157	30	46.5
Gender	Male	129	47	171	33	49.8
	Female	144	53	348	67	50.2
Education	High School	32	12	86	17	48.4
	College	181	67	355	67	43.5
	Graduate School	59	22	85	16	8.1
Ethnicity	African American	10	4	16	3	11.5
	Caucasian	210	77	444	85	47.0
	American Indian	6	2	6	1	0.7
	Hispanic	29	11	32	6	36.0
	Asian	12	4	12	2	3.4
	Other	6	2	10	2	1.3
Age	Less than 25	35	13	1	0	38.7
	25-39	69	26	43	8	15.2
	40-55	81	30	156	30	28.4
	More than 55	86	32	319	61	17.6
Income	Under $25,000	45	16	67	13	26.7
	$25,000-$50,000	85	31	151	29	26.6
	$50,001-$75,000	57	21	121	23	17.9
	$75,001-$99,999	36	13	84	16	11.3
	$100,000-& above	51	19	101	19	17.5

Source: U.S. Census Bureau, 2000 and 2005-2007 American Community Survey

Table 3. Willingness to Pay for Texas Superstar® Model Results

	Tobit			
	Coefficient	**Standard Error**	**t-value**	**Marginal Effects**
Intercept	0.109***	0.020	5.530	
Socio-demographic characteristics				
AGE2	-0.016	0.013	-1.292	-0.043
AGE3	-0.019*	0.010	-1.839	-0.051
AGE4	-0.019*	0.010	-1.834	-0.050
FEMALE	0.013	0.011	1.128	0.033
MARRIED	0.015	0.011	1.301	0.039
INC2	-0.003	0.006	-0.558	-0.009
ET2	0.003	0.014	0.199	0.007
ET3	0.002	0.012	0.174	0.006
EDU2	0.005	0.007	0.667	0.013
EDU3	0.010	0.010	0.940	0.025
Consumer habits				
REGU	0.017	0.014	1.175	0.044
PP	-0.027*	0.015	-1.763	-0.071
POST	-0.009	0.012	-0.709	-0.023
TSAW	0.039***	0.014	2.779	0.104
Region				
REG2	0.001	0.007	0.124	0.002
REG3	-0.003	0.008	-0.355	-0.007
SIGMA	0.096***	0.004	25.463	
Number of usable observations	390			

* P-value < 0.1, ** P-value < 0.05, *** P-value < 0.01

Table 4. Willingness to Pay for Earth-Kind® Model Results

	Tobit			
	Coefficient	**Standard Error**	**t-value**	**Marginal Effects**
Intercept	0.099***	0.020	4.971	
Socio-demographic characteristics				
AGE2	-0.013	0.012	-1.133	0.291
AGE3	-0.028***	0.010	-2.916	-0.084
AGE4	-0.033***	0.010	-3.364	-0.097
FEMALE	0.024**	0.011	2.268	0.073
MARRIED	-0.007	0.011	-0.677	-0.022
INC2	0.005	0.006	1.064	0.018
ET2	0.009	0.013	0.693	0.027
ET3	0.001	0.012	0.061	0.002
EDU2	0.001	0.007	0.141	0.003
EDU3	0.013	0.010	1.374	0.040
Consumer habits				
REGU	0.006	0.014	0.447	0.018
PP	-0.008	0.015	-0.570	-0.025
POST	-0.009	0.012	-0.775	-0.027
EKAW	0.065***	0.014	4.536	0.192
Region				
REG2	0.009	0.007	1.300	0.027
REG3	-0.003	0.008	-0.487	-0.011
SIGMA	0.095***	0.004	24.971	
Number of usable observations	400			

* P-value < 0.1, ** P-value < 0.05, *** P-value < 0.01