WILLINGNESS TO PAY A PREMIUM FOR PRODUCE AT DIRECT MARKETING OUTLETS: AN ORDERED PROBIT ANALYSIS

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ABSTRACT

The concept of farm to consumer direct marketing has been popularly known to create opportunities for farmer-consumer relationship and enhance the sustainability of the local farming business. The objective of the present study was to predict the consumers' willingness to pay for fresh produce in the direct marketing outlets and agritourism activities. An Internet survey relating to direct marketing and agritourism was conducted to understand the characteristics of consumers. A total of 1,134 participants completed the survey from Delaware, New Jersey, and Pennsylvania. Based on their responses, an ordered probit model was developed at a low premium (1-5 percent), medium premium (6-10 percent) and high premium (11percent and above) to predict respondents' willingness to pay a premium for produce sold at direct marketing outlets. The estimated results show that consumers' willingness to pay more to help preserve farmland or local business is highly significant. However, we discovered an inverse relationship for the Mid-Atlantic fresh greens shoppers. On average, as the travel distance increases, the likelihood of paying a higher premium decrease based on each additional mile they travel. The results of the ordered probit model will help all relevant stakeholders from the Mid-Atlantic States to promote direct marketing and agritourism industry in the region and enhance their knowledge of the industry.

Keywords: Consumers survey, ordered profit analysis, willingness to pay, farmers to consumers, direct marketing outlets.

INTRODUCTION

Direct-to-consumer sales outlets such as roadside stands, farmers' markets, pick-your-own, community supported agriculture, on-farm stores are directly connected to consumer demand for locally-grown foods (Henderson and Linstrom, 1982). In the

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U.S.A small and medium growers have limited land and capital resources which affect the economic viability of the small farm business. Agritourism and direct marketing are used by the farmers to supplement farm income. Agritourism and eco-tourism may include a wide range of farm-related products and services that are educational, interactive, or recreational in nature (Surendran and Sekar, 2010; Tew and Barbieri, 2012; Koutsouris et al., 2014; Chiu et al., 2016). Other direct marketing methods also able to break common obstacles such as farm size, delivery logistics, limited marketing budget, and labor constraints etc. Hence, small and medium-sized farmers make use these direct marketing activities to enhance farm income(Tew and Barbieri, 2012; Koutsouris et al., 2014; Chiu et al., 2016). The direct marketing outlets allow farmers to sell their products directly to their targeted consumers, rather than having their goods pass through several hands before it reaches the ultimate consumer, as it often has. Also, producers can capture a large portion of the product margin by selling directly to the consumer, and consumers know that they can get locally-grown fresh, high quality produce at affordable price along with other factors, including the shopping atmosphere, environmental consciousness, appearance, and variety compared to the identical product retailed in supermarkets (Brown, 2003; Onyango et al., 2015).Consumers also derive cultural and social benefits from direct contacts with farmers, visits to farm and nature (Surendran and Sekar, 2011).

By using direct marketing, producers can cut out the "middleman" in a lot of their operations and eliminate additional expenditures on services such as packaging, storing, transporting, and marketing the goods. Media coverage also reflects contradiction between direct marketing outlets and supermarkets. Further, federal nutrition programs that support purchases from direct marketing venues (e.g. Farmers' Market Nutrition Program, Senior Farmers' Market Nutrition Program) notice quality of produce to be as good (or better), and/or prices to be affordable at the direct market outlets compared to grocery stores (McCormack et al., 2010). The flexibility allows farmers to determine their own product mix and to balance this production between consumer demand and individual talents for produce marketing. Producers who can raise specialty crops such as flowers, snow peas, or peppers, have successfully used direct farmers to consumer marketing to provide products during special seasons or to special ethnic groups (Govindasamy et al., 2015).

Many studies have concentrated on outcomes and benefits of farmers to consumers direct marketing and agritourism activities (Tew and Barbieri, 2012; Kline et al., 2016). However, very few have addressed Willingness to Pay a Premium price (WTP) for traditional produce at Direct Marketing Outlets (Balogh et al., 2016; Dominique et al., 2016). The WTP is often used in determining the market potential of farm/environmental activities (Surendran and Sekar, 2011; Onyango et al., 2015). In most of these studies, researchers have hypothesized that consumers WTP are influenced by socio- demographic factors such as age, education, income, gender, marital status and number of children in the family (Surendran and Sekar, 2010; Govindasamy et al., 2014; Balogh et al., 2016).To encourage direct marketing, it is

crucial to explore participant's interests, preferences and needs pertaining to these activities and opportunities. The purpose of this research is to determine how well farmer to consumer direct markets serve the needs of the consumer by providing an overview of characteristics of direct marketing patrons.

METHODOLOGY

An Internet survey pertaining to direct marketing and agritourism was conducted in June and July 2010to document the characteristics of consumers, who buy at farmer-to-consumer direct market outlets and/or visit agritourism operations in the Mid-Atlantic States. A total of 1,134 participants completed the survey from Delaware, New Jersey, and Pennsylvania. Of the questions asked, respondents acuity about direct marketing outlets and agritourism activities and their willingness to pay a premium for produce at direct marketing outlets were used in the model. From a panel set, the respondents were randomly selected by a survey research company (Sampling International, LLC, and Shelton, CT). Nearly 2,594 members who were registered with this panel, accessed the survey (952 from NJ, 309 from DE, and 1,384 from PA). However, 1,134members met the screener criteria and began the questionnaire (424 from NJ, 133 from DE, and 577 from PA), with 993 respondents completing the study (122 from DE, 364 from NJ, and 507 from PA). Likely respondents were screened and asked to participate if they were: 1) primary food shopper for the household; 2) age 18 and older, and 3) had previously attended agritourism and direct marketing events or activities. Survey questions were pre-tested to a sample of 93 randomly selected Survey Sampling International, LLC panelists.

Ordered Probit analyses of willingness-to-pay (WTP)

The levels of willingness to pay for fresh produce by consumers are of at most importance for farmers operating a direct market platform. The Ordered Probit model implemented is selected over OLS (Ordinary Least Squares) because the nature of the dependent variable is categorical and will provide a greater generality of the purchase likelihoods. The WTP model here can be interpreted as a latent variable that observes the cause of what influences decisions. Three categories of the WTP are estimated using the model: willing to pay a low premium (1-5percent), willing to pay a medium premium (6-10 percent) and willing to pay a high premium (11percent and above) for the fresh greens sold at direct farmer markets. The probability of the categories is estimated under a normal curve calculated as (Greene and Hensher, 2010):

$$\text{Prob } [y=1] = \Phi(-\beta' x), \tag{1}$$

$$\text{Prob } [y=2] = \Phi(\mu - \beta' x) - \Phi(\beta' x) \tag{2}$$

$$\text{Prob } [y=3] = 1 - \Phi(\mu - \beta' x) \tag{3}$$

Where μ is the threshold parameter, Φ is the cumulative normal and x is the vector of independent variables. The threshold parameters are adjusted to make probabilities match sample proportions and do not follow discrete normal or logistic distribution (Greene and Hensher, 2010). WTP here is driven by the extent to which utilities change with regards to the individual consumption choices. If the consumers' WTP falls within a certain range, the numeric value that is assigned to it, reflects the category of individuals' willingness-to-pay. The summary descriptive statistics of explanatory variables are shown in table 1.

Table 1. Descriptive statistics

Variable	Description	Mean Units/ Percentage	SD Units/ Percentage
WTPi *(Dependent Variable)*	WTPi=1 if the respondent is willing to pay a low premium; / WTPi=2 - Medium premium; WTPi=3 - High premium for fresh greens sold at direct markets.	1.02	0.77
RESI_1	1 if the respondent lives at the current location for less than a year; 0=otherwise	0.01	0.23
RESI_3	1 if the respondent lives at the current location for one to three years; 0=otherwise	0.14	0.35
HOME_GR	1 if the respondent has a garden at home; 0= otherwise	0.50	0.50
WTP_HELP	1 if the respondent is willing to pay higher prices to preserve farmland and local agricultural producers; 0= otherwise	0.86	0.34
AG_HELP	1 if the respondent believes that agriculture will help maintain open space/greenery; 0=otherwise	0.96	0.18
ORGANIC	1 if the respondent is willing to buy certified organic fresh fruits and vegetables; 0= otherwise	0.69	0.46
GMO	1 if the respondent is willing to buy genetically modified fresh fruits and vegetables; 0= otherwise	0.18	0.38
QUAL	1 if the respondent thinks that quality of fresh produce sold at direct outlets is better; 0=otherwise	0.94	0.23
PRICE	1 if the respondent thinks that price of fresh produce sold at direct outlets is better; 0=otherwise	0.58	0.49
G_Q	1 if the respondent is a male who thinks the quality of fresh produce sold at direct market outlet is better; 0=otherwise	0.23	0.42
G_P	1 if the respondent is a male who thinks the price of fresh produce sold at direct market outlet is better; 0=otherwise	0.13	0.33

Variable	Description	Mean Units/ Percentage	SD Units/ Percentage
MKTING_B	1 if the respondent has first learned direct outlets through billboard or roadside sign; 0=otherwise	0.38	0.49
MKTING_S	1 if the respondent has first learned direct outlets through sign at the market's entrance; 0=otherwise	0.52	0.50
MKTING_P	1 if the respondent has first learned direct outlets through newspaper; 0=otherwise	0.46	0.50
MKTING_M	1 if the respondent has first learned direct outlets through friends/family/word-of-mouth; 0=otherwise	0.75	0.44
OFM_SP	Average spending per visit at direct markets other than OFM	18.66	20.47
VAL_ADD	1 if the respondent thinks it is not important to purchase value-added products (for example: jams, honey, baked goods) when deciding to visit an agritourism location; 0= otherwise	0.61	0.49
GENDER	1 if the respondent is a male; 0=otherwise	0.26	0.44
AGE_M65	1 if the respondent is over 65 years old; 0=otherwise	0.01	0.29
ETH_WHT	1 if the respondent's ethnicity is White/Anglo; 0=otherwise	0.88	0.32
INC_80	1 if the respondent has annual income between US$ 60,000-79,999 before taxes for year 2009; 0=otherwise	0.19	0.39
INC_100	1 if the respondent has annual income between US$ 80,000-US$ 99,999 before taxes for year 2009; 0=otherwise	0.14	0.35
INC_M100	1 if the respondent has annual income more than US$ 100,000 before taxes for year 2009; 0=otherwise	0.20	0.40
AVG_DIS	Average miles traveled to direct outlets	6.73	4.61
DIST_NJ	Average miles of New Jersey residences traveled to direct outlets	2.37	4.30
EDU-2YRC	1 if the respondent has a two-year college or technical degree education: 0=otherwise	0.26	0.44
EDU_4YRC	1 if the respondent has a four-year college education: 0=otherwise	0.30	0.46
EMP_RE	1 if the respondent is currently retired: 0=otherwise	0.16	0.37
EMP_SE	1 if the respondent is currently self-employed: 0=otherwise	0.01	0.28

The Ordered Probit model is developed as

$WTP_i = \quad \beta_0 \quad +\beta_1 \, HOME\_GRO +\beta_2 \, WTP\_HELP +\beta_3 \, AG\_HELP +\beta_4 QUAL$

$+\beta_5 \, PRICE +\beta_6 \, G\_Q +\beta_7 \, G\_P +\beta_8 \, ORGANIC +\beta_9 \, GMO$

$+\beta_{10} \, MKTING\_M+ \beta_{11} \, MKTING\_B +\beta_{12} \, MKTING\_S +\beta_{13} \, MKTING\_P$

$+\beta_{14} \, OFM\_SP +\beta_{15} \, VAL\_ADD +\beta_{16} \, RESI\_1 +\beta_{17} \, RESI\_3 +\beta_{18} \, AVG\_DIST$

$+\beta_{19} \, DIST\_NJ + \beta_{20} \, Gender+ +\beta_{21} \, AGE\_M65 +\beta_{22} \, ETH\_WHT +\beta_{23} \, INC\_80$

$+\beta_{24} \, INC\_100 +\beta_{25} \, INC\_M100 +\beta_{26} \, EDU\_2YRC +\beta_{27} \, EDU\_4YRC +\beta_{28} \, EMP\_SE$

$+\beta_{29} \, EMP\_RE + \varepsilon_i$…………………………….......................….(4)

RESULTS AND DISCUSSION

Table 2 & 3 provides the results of an Ordered Probit model with estimated coefficients and marginal effects of the selected explanatory variables. The overall model is significant with the McFadden's R-square of 0.04. The correct percentage count is 44 percent, which is estimated over a third of the prediction.

Table 2. Ordered probit parameter estimates of WTP at direct market outlets

Sl. No	Variable	Coefficient	Standard Error	Marginal Change		
				Willing to pay a low premium 1-5%	Willing to pay a medium premium 6-10%	Willing to pay a high premium 11% and above
1	Constant	0.4951	0.2518			
2	RESI_1	0.0710	0.1041	-0.0228	-0.0026	0.0254
3	RESI_3	-0.0707	0.1041	0.0235	0.0011	-0.0246
4	HOME_GR	0.0003	0.0005	-0.0001	0.0000	0.0001
5	WTP_HELP***	0.3101	0.1106	-0.1081	0.0058	0.1023
6	GENDER	0.3472	0.3908	-0.1073	-0.0192	0.1265
7	AGE_M65	-0.0007	0.0005	0.0002	0.0000	-0.0002
8	ETH_WHT**	0.0009	0.0004	-0.0003	0.0000	0.0003
9	ORGANIC	0.0005	0.0005	-0.0002	0.0000	0.0002
10	GMO	-0.0002	0.0005	0.0001	0.0000	-0.0001
11	QUAL	0.0198	0.2497	-0.0065	-0.0004	0.0070
12	PRICE*	-0.1779	0.1020	0.0578	0.0051	-0.0630
13	G_Q	-0.5249	0.3994	0.1841	-0.0144	-0.1697
14	G_P*	0.1779	0.1021	-0.0557	-0.0088	0.0646
15	MKTING_M	-0.1071	0.0860	0.0345	0.0037	-0.0382
16	MKTING_B	0.1420	0.0896	-0.0459	-0.0045	0.0504

Sl. No	Variable	Coefficient	Standard Error	Marginal Change		
				Willing to pay a low premium 1-5%	Willing to pay a medium premium 6-10%	Willing to pay a high premium 11% and above
17	OFM_SP	0.0004	0.0003	-0.0001	0.0000	0.0001
18	VAL_ADD	0.0003	0.0004	-0.0001	0.0000	0.0001
19	INC_80	-0.1228	0.0872	0.0412	0.0012	-0.0424
20	INC_100	0.1007	0.0928	-0.0323	-0.0038	0.0360
21	INC_M10	0.0205	0.0862	-0.0067	-0.0006	0.0072
22	AG_HELP*	-0.0008	0.0005	0.0003	0.0000	-0.0003
23	AVG_DIS**	0.0210	0.0104	-0.0069	-0.0005	0.0074
24	DIST_NJ**	-0.0212	0.0105	0.0070	0.0005	-0.0075
25	MKTING_S	-0.1189	0.0849	0.0388	0.0032	-0.0420
26	MKTING_P	0.0838	0.0812	-0.0274	-0.0022	0.0296
27	EDU_4YRC	-0.0145	0.0801	0.0048	0.0003	-0.0051
28	EMP_SE	0.1257	0.0991	-0.0398	-0.0056	0.0454
29	EMP_RE	-0.1255	0.0990	0.0422	0.0010	-0.0432
30	EDU_2YRC***	-0.2945	0.0848	0.1005	-0.0010	-0.0995

McFadden R^2:0.04   Chi squard: 59.03

Degrees of freedom: 29   Overall Model Significance: 0.00

*** *Significant at 1%; **Significant at 5%; * Significant at 10%*

Table 3. Ordered probit model prediction success of the WTP

Actual Value	Predicted			Correct Total
	0	1	2	
0	10	98	6	114
1	9	147	25	181
2	5	95	31	131
Total	24	340	62	426

Number of correct predictions: 188   Percentage of correct predictions: 44%

The results show that the marginal effect for consumers' willingness to pay more to help preserve farmland or local business is highly significant.
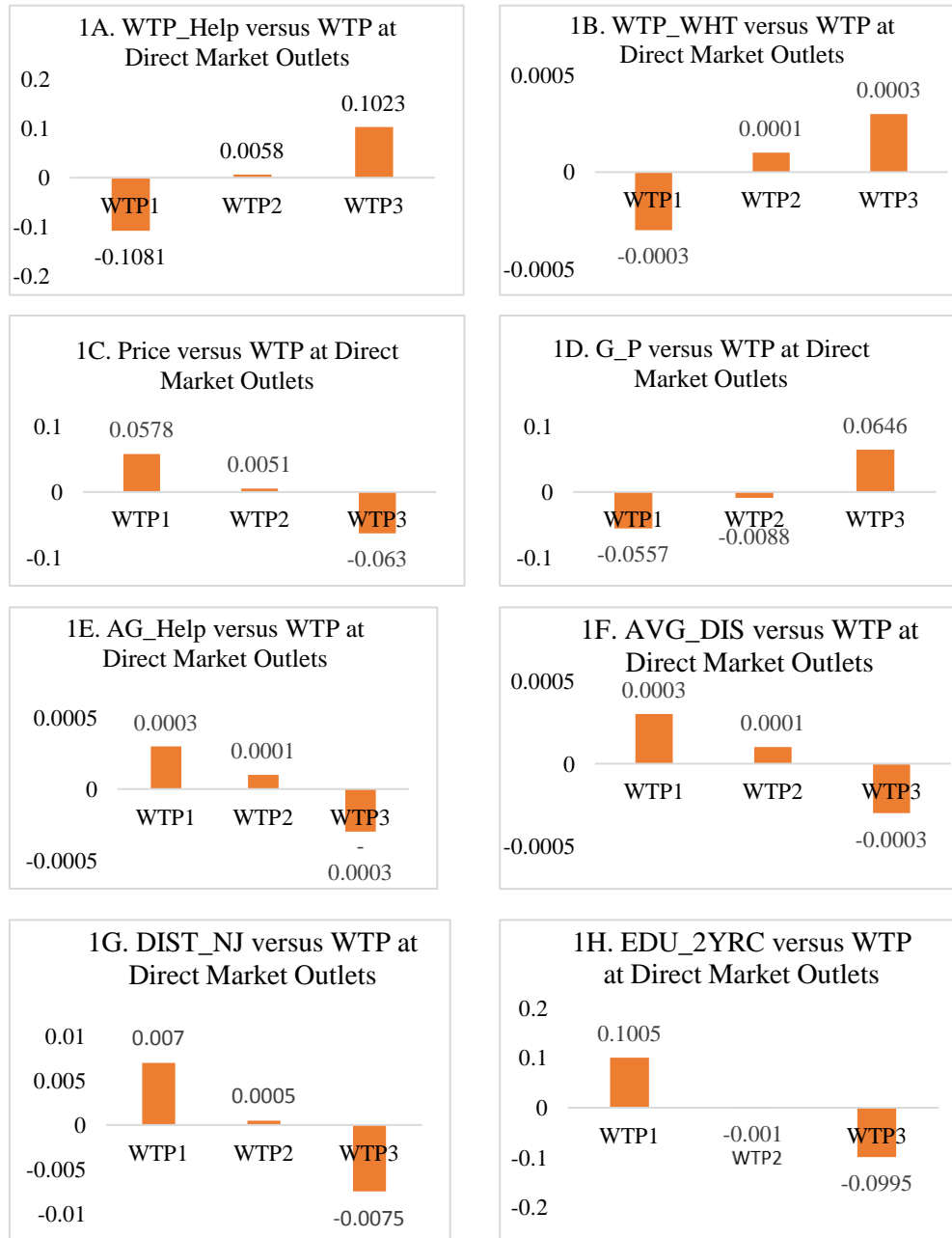
Figure 1 (A-H). Impact of marginal effects on WTP at direct market outlets

As shown in figure 1A, the marginal effect of WTP_HELP (WTP3- high premium) is 0.10, which means that the respondent who values farmland preservation is 10 percent more likely to be willing to pay a high premium for fresh greens sold at direct markets compared to those who think otherwise. A similar result reported that consumers are willing to spend time and money to support local food production (Painter, 2007; Baker, Hamshaw, & Kolodinsky (2009). However, the marginal effect of *WTP_HELP* (WTP$_1$ low premium) is -0.11 (Figure-1A), which means that the respondent who is preferring to preserve farmland will be around 11 percent less likely to be willing to pay a low premium for fresh greens sold at direct market outlets compared to those who think otherwise. This statistical result is consistent with the theoretical belief that higher the awareness of farmland protection, higher the premium a concerned consumer is willing to pay.

Another environmental awareness related variable, which indicates that agriculture will help maintain open space/greenery, is also significant. Similarly, Williams and Hammitt (2001) and Underhill and Figueroa (1996) studies show that consumers WTP to pay for organic foods is related to the perception of environmentally friendly and supportive of small-scale agriculture and local rural communities. The marginal effect of *AG_HELP* (WTP$_1$low premium) is 0.0003 (Figure 1E). Although low in magnitude, the respondent who believes that agriculture will help maintain open space/greenery is more likely to pay a low premium compared to those who do not believe so. On the other hand, the marginal effect of *AG_HELP* (WTP$_3$- high premium) is -0.0003, which means that the respondent who is believes in open space/greenery is less likely to be willing to pay a high premium compared to those who do not believe in open space/greenery. As one can observe from figure 1, greenery awareness is an important concept at a low premium markup.

The price of fresh produce is a crucial factor determining consumer's willingness to pay at direct market outlets. The price variable from the survey maps out individual shopper's attitudes towards the prices of fresh produces in direct market outlets (Figure-1C). The marginal effect of price (WTP$_1$- low premium) is 0.06, which denotes that the respondent who thinks that the prices of produce are better at direct markets are 6 percent more likely to pay a low premium at direct market outlets because they think prices of produce is better at direct market outlets compared to other markers. However, the marginal effect of price (WTP$_3$- high premium) is 0.06, which means that individual shoppers are 6 percent less likely to pay a high premium compared to those who thoughts otherwise. From the above observation, the direct market outlet operators must be tactical at marking the prices of goods if they want to increase their revenues. An interaction term of gender and price was included in this analysis. The marginal effect of *G_P* (WTP$_3$- high premium) is 0.06 (Figure 1D), which means that male shoppers who also think that price of fresh produce is better at direct market outlets are 6 percent more likely to pay a high premium compared to female shoppers who don't think the price is better at direct market outlets as shown in figure-1D. However, in another study, an opposite's relation was reported that

females were more likely to pay a higher price (Brown, 2003).Moving onto demographic variables, the marginal effect of ethnicity WTP_WHT (WTP3- high premium) is 0.0003, which means that Caucasians are more likely to be willing to pay a high premium compared to those of other ethnicities (Figure-1B). They are, however, less likely to be willing to pay a low premium compared to those of other ethnicities. This variable is interestingly discovered, as it has not played much significance in past similar studies. The marginal effect of *ECU_2YRC (*WTP1 -Low Premium*)* is 0.1005 (Figure-1H), which means that a two-year college degree respondent is 10 percent more likely to be willing to pay a low premium compared to those with other educational levels. They are also less likely to be willing to pay a medium and high premium compared to those with other educational levels. This could imply that the magnitude of willing to pay more at direct market outlets are educationally related but will be influenced by other consumer behavior and utility maximization theories.

On average, New Jersey residences are less likely to be willing to pay a higher premium for fresh produces for each additional mile they travel. Looking at the marginal effect of *DIST_NJ* (WTP$_3$- high premium) is -0.01, which means that they will be around 1 percent less likely to be willing to pay a high premium based on each additional mile they travel (Figure-1G). However, we discovered a similar relationship for the mid-Atlantic fresh greens shoppers. On average, as the travel distance increases, the likelihood of paying a higher premium decrease based on each additional mile they travel ((Figure 1F).

CONCLUSION

This study examined the relationships between consumer willingness to pay a premium for direct marketing outlets produce and their economic, demographic, and produce attributes. Based on these results, farmers can develop marketing strategies to increase the profitability of farm business. The results of this study have important implications for the agricultural industry. The understanding of the consumer expectations and demands will assist in the successful placement of the food products in the direct marketing and agritourism outlets. This study may serve as an outreach tool to reach the potential consumers. The findings of this study will also aid industry to develop strategies capable of better anticipating and perhaps bringing about changes in market demand relative to novel products.

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