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Selected Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Providence, Rhode Island, July 24–27, 2005

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CONSUMER ACCEPTANCE OF GENETICALLY MODIFIED FOODS IN TAIWAN: IS POSITIVE DISCOUNT THE SAME AS NEGATIVE PREMIUM?

NAOYA KANEKO AND WEN S. CHERN

This paper finds Taiwanese consumers' willingness to pay a premium on the non-GM food differs from their willingness to accept a discount on the GM food. It further finds that the non-GM choosers are more committed to the non-GM food than the GM choosers to the GM food.

Keywords: Genetically Modified, Contingent Valuation, Willingness to Pay, Stated Preference.

1 Introduction

Since their introduction to the market, genetically modified (GM) foods have been attracting much attention of agricultural economists. To study consumer acceptance of GM foods, researchers have used stated preference methods such as contingent valuation and choice experiment (Chern, Rickertsen, Tsuboi, and Fu, 2003; Grimsrud, McCluskey, Loureiro, and Wahl, 2004; Li, McCluskey, and Wahl, 2004; Lusk, Roosen, and Fox, 2003; Moon and Balasubramanian, 2003; Boccaletti and Moro, 2000). Since GM foods with direct consumer benefits are in the pipeline, many authors have used choice experiment to estimate part-worths of various GM attributes (see Burton and Pearse and Burton, Rigby, Young, and James, for instance). Even some second-generation GM foods are near commercial reality, there still exist uncertainties about the effectiveness of such products or attributes. We would not attempt to estimate the market potential of some novel products. We would rather focus on how the acceptance is formed of the currently available GM foods.

Consumer acceptance of GM foods is an elusive notion. Many consumers probably want to avoid GM foods until their long-term effects on human health becomes clear. However, there are other consumers who would like to support them for their environmental benefits. It is not clear how the acceptance of a society looks like if the population consists of consumers of such diverse preferences. Researchers have been trying to find whatever factors determines the acceptance, but the determinants need not be the same for all consumers. It is quite conceivable that different consumer segments exhibit different behavior, determined by different factors. It is thus useful to consider consumer segments (Baker and Burnham, 2001). Although some authors consider consumer segments, little is known about how the willingness to pay or accept differs across segments. We develops a valuation method that is useful for comparing the two welfare value concepts.

The objectives of this paper are to determine if the willingness to pay a premium on the non-GM food is different from the willingness to accept a discount on the GM foods and to determine if the non-GM choosers are more committed to the non-GM food than the GM choosers are to the GM food. We first examine how the non-GM choice and GM choice differ from not choosing either. We then find what determines the non-GM/GM choice separately for the non-GM and GM

choosers. We next test the equality of willingness to pay a premium and willingness to accept a discount and then the equality of willingness to commit to one's initial position between the non-GM and GM choosers. Our results indicate that Taiwanese consumers' willingness to pay a premium on the non-GM food differs from their willingness to accept a discount on the GM food and that the non-GM choosers are more committed to the non-GM food than the GM choosers to the GM food. The next section briefly describes our survey and the methods for analysis. The paper concludes with a discussion of our findings.

2 Procedure

We conducted a Taiwanese national telephone survey in 2003 using the random digit dialing method. The total of 1004 food shoppers completed substantial portions of the questionnaire in telephone interviews.[1] The questionnaire consists of three major parts. The first part seeks to find respondents' knowledge, attitude, and perception with regard to GM foods. The second part consists of a series of paired comparison involving vegetable oil. Of the 1004 respondents, 508 completed substantial portions of the questionnaire related to vegetable oil.[2] The third part is concerned with the demographic information of the respondents.

The paired-choice valuation question proceeds similarly to the standard double-bounded dichotomous choice CV. First, respondents are asked to choose either a GM or non-GM alternative, given the equal base price, which is based on the observed market values of the product. The next question depends on the answer to the first question. If the respondent chose the non-GM alternative, then either the GM price will be decreased or the non-GM price will be increased. The rate of price discount or increase will be assigned randomly (10%, 30%, or 50%). If the GM was chosen instead, either the non-GM price would be reduced or the GM price would be increased in the same fashion (Exact wording is provided in the appendix).[3] Note that since there is no price difference in the initial question, respondents may be indifferent between the non-GM and GM alternatives if the GM status is truly irrelevant to them. If that is the case, indifference is a natural choice, and so we provided this option. Although this option is interesting in its own right, we focus on the non-GM and GM choice in this paper. However, we use the indifference option to highlight the

difference between the non-GM and GM choice below.

In order to analyze how price, demographic variables as well as knowledge/perception/attitude variables affect the choice between GM and non-GM alternatives, we invoke the random utility model. The model allows us to parameterize the probability of choosing one alternative over the other. Let U^1 and U^0 be the utility functions for consuming the non-GM and GM alternatives. We assume that the utility functions have a linear form: $U^1 = \beta_0^1 + \beta_1 P^1 + \boldsymbol{\beta}_2^{1\prime}\boldsymbol{x} + \varepsilon^1$ and $U^0 = \beta_0^0 + \beta_1 P^0 + \boldsymbol{\beta}_2^{0\prime}\boldsymbol{x} + \varepsilon^0$, where P^1 and P^0 indicate the non-GM and GM prices, respectively, and $\boldsymbol{x}$ is a vector of respondent characteristics (note that β_1 is the common price coefficient). The respondent would choose the non-GM alternative if and only if $U^1 > U^0$. This condition is alternatively expressed by the statement $U > 0$, where $U \equiv U^1 - U^0$. We assume that the utility difference is a linear function such that

$$U = \beta_0 + \beta_1 \Delta P + \boldsymbol{\beta}_2' \boldsymbol{x} + \varepsilon, \tag{1}$$

where $\Delta P \equiv P^1 - P^0$, $\beta_0 \equiv \beta_0^1 - \beta_0^0$, $\boldsymbol{\beta}_2 \equiv \boldsymbol{\beta}_2^1 - \boldsymbol{\beta}_2^0$, and $\varepsilon \equiv \varepsilon^1 - \varepsilon^0$. Equation (1) provides the basis of econometric analysis. We define the dependent variable $Y1$ as follows:

$$Y1 = \begin{cases} 1 & \text{if } U > 0, \text{ or one chooses Non-GM} \\ 0 & \text{otherwise.} \end{cases}$$

Assuming that the errors have a normal distribution with zero mean, we obtain a Probit model. The maximum likelihood estimation of the model is routine with any of the popular econometric softwares.

We first focus on what distinguishes the choice of non-GM and GM over indifference. Intuitively, non-GM choosers should be highly concerned with the risks posed by the GM foods while GM choosers and indifferent respondents are not so risk-conscious. What is more interesting is the distinction between the GM choosers and indifferent respondents. It is expected that GM choosers should appreciate the potential benefits provided by the genetic modification technology. We use Probit models to explain what encourages respondents to make a substantive choice instead of

being indifferent.

We next consider the distinction between the willingness to pay a premium on the non-GM alternative and the willingness to accept a discount on the GM alternative. Our valuation question is different from the standard contingent valuation in that the reference utility level is not specified.[4] Instead of imposing the researcher-determined status quo, we let the respondents choose the status quo or entitlement to an alternative by choosing either alternative given the equal price. Once the initial choice is made, we ask respondents whether they want to stay with the chosen alternative by paying higher prices or switch to the other alternative by accepting the lower price. There are two possible follow-up scenarios: (1) the price of chosen alternative is raised or (2) the price of forgone alternative is lowered. The welfare values derived from the two scenarios need not be the same. We examine the choice between the non-GM and GM alternatives using the follow-up question. We first pool the two scenarios and estimate a single Probit model with the dummy variable for the scenario included. We use a t-test of significance of the dummy variable to test for the equality between willingness to pay a premium and willingness to accept a discount. We then use a Probit model separately for each of the scenarios without the scenario dummy and use a likelihood-ratio test to test for the equality.

We next examine the degree of commitment to the chosen alternative among the non-GM and GM choosers. We do this by defining a new dependent variable $Y2$ such that

$$Y2 = \begin{cases} 1 & \text{if one stays with the initially chosen alternative} \\ 0 & \text{if one switches to the initially forgone alternative} \end{cases}$$

We keep the basic set-up in equation (1) except that the sign of the price difference for GM choosers must be reversed. As before, we can examine the effect of initial Non-GM/GM choice by using a t-test of significance of the dummy variable or a likelihood ratio test.

3 Results

Table 1 presents the definition of key variables along with sample statistics. The sample statistics are provided for the initial non-GM choosers, initial GM choosers, indifferent respondents, and

all respondents. As indicated by the number of respondents in each of these groups, about 32% of Taiwanese consumers choose the GM vegetable oil even at the equal price while about 54% choose the non-GM vegetable oil. The latter percentage is much lower than the equivalent figure from our Japanese survey while it is about the same as that from our U.S. survey. What is distinct about the Taiwanese result is that the percentage for the GM alternative is high and that for the indifference option is low. It appears that many Taiwanese respondents do not hesitate to choose the GM alternative. We examine the qualitative difference between the non-GM and GM groups by comparing them against the indifferent group below.

Taiwanese consumers are not necessarily knowledgeable about GM foods because the objective knowledge (measured by TF) is low. However, they admit they know at least something about GM foods as indicated by the higher averages on the subjective knowledge variable (KNOW). What is more interesting is that the average score on KNOW is highest in the Non-GM group while it is lowest in the GM group. This result indicates that the choice between non-GM and GM are largely based on the image or impression rather than on knowledge. The variables related to potential benefits and risks are consistent with the expectation: e.g., higher risk perception leads to the choice of the non-GM alternative. The religious or ethical concerns are not so important to the Non-GM-GM choice.

Although Table 1 reveals the profile of the different consumer segments, we need to rely on regression analysis to find a more complex association of variables. Table 2 compares the non-GM and GM groups against the indifference group. The purpose of the regression is to find out the determinants of substantive choice. The separate comparisons are useful because the non-GM and GM groups need not have the same priorities with regard to potential benefits and risks of GM foods. For this reason, we include all the candidate variables irrespective of the level of significance. According to table 2, the Taiwanese consumers do not seem to appreciate environmental benefits of GM foods. Both PEST1 and PEST2 are not associated with either the non-GM choice or GM choice. On the other hand, variables related to benefits and risks to human health tend to be significant. For instance, the GM choice is positively influenced by RP2, which indicates that if consumers perceive GM foods as safe for human health, they tend to choose the GM alternative

rather than being indifferent. If one takes a stance (either positive or negative) toward potential allergic reaction, one tends to choose the indifference option. This may be counterintuitive at first glance; it just indicates that the potential health risk is irrelevant to the indifferent respondents. On the flip side, the Taiwanese consumers tend to choose the non-GM alternative if they have a position toward nutritional benefits of GM foods. This strongly indicates that nutritional benefits are truly irrelevant to the indifferent respondents. The above observations tell us that if we wish to estimate the average welfare value for the entire sample, we should not ignore indifferent respondents. However, since we are concerned with the behavior of non-GM and GM choosers in this paper, we will exclude indifferent respondents from the analysis below.

Table 3 presents the parameter estimates for the separate Probit models for the non-GM and GM choosers. The dependent variable is $Y1$ for both groups. We include as many candidate variables as possible in order to examine what determines the willingness to pay a premium on the non-GM alternative or the willingness to accept a discount on the GM alternative. The variables of interests are knowledge (KNOW and TF), attitude toward risks for human health (RP and ALG), attitude toward benefits for human health (NUT), religious or ethical attitude, and attitude toward environmental benefits (PEST).[5] The sample size is reduced because of missing observations. Especially, the regression for the GM group must be viewed with caution because of the lack of statistical power due to a small sample size.

With the above caveat in mind, we notice the significance of PEST1 for the GM group. This indicates the presence of some subsegment of consumers in the GM group who choose the GM alternative for the reduction of pesticide use. Considering none of the other attitudinal variables are significant for the GM group, we conclude that the GM choosers choose the GM alternative mainly for environmental friendliness. The knowledge variables are not significant for the GM group, which reflects the fact that most consumers are not knowledgeable and that the subjective knowledge level is low for the GM group. The price difference is highly significant for the GM group, which indicates the choice is determined by the price factor.

On the other hand, the non-GM group cares mostly the aspects related to human health, as indicated by the significance of RP1 and ALG2. This means that the non-GM group chooses

the non-GM alternative mainly to avoid risks. The behavior of ethical and religious preference variables is somewhat odd; the respondents who value ethical/religious considerations and those who do not are more likely to choose the non-GM alternative than those who are neutral. The higher significance indicates, however, that the more religious one is, the more likely one will choose the non-GM alternative. The knowledge variables are also insignificant for the non-GM group. This may be no surprise if we consider that most consumers are not very knowledgeable. The price variable is also highly significant, indicating that the many consumers in the non-GM group are willing to choose the GM alternative if sufficient discounts are given.

The effect of raising and lowering prices of alternatives is measured by the coefficient of the variable DISC, which is equal to 1 if the discount on the forgone alternative is used and 0 if the price of the selected alternative is raised. As can be seen from table 3, the dummy variable is insignificant for both groups. The t-ratios are -0.802 and -0.430 for the non-GM and GM groups, respectively. In both cases, the coefficient on the dummy variable DISC is statistically indistinguishable from zero. The same conclusion is obtained from the likelihood ratio tests for the GM group: the likelihood ratio test statistic is 25.417, which fail to reject the restrictions on the coefficients (p-value=0.114). However, the result for the non-GM group is rather different. The likelihood ratio test statistic is 49.120, which reject the restriction at the p-value less than 0.001. The confusing result may be due to the smallness of the sample size. The t-tests are based on a poorly fit regression equations, so the likelihood ratio test is more reliable in this case. Reflecting on the above considerations, we tentatively conclude that there is some evidence that it matters whether to use a price increase or a price discount.

We next examine the degree of commitment to the selected alternatives between the non-GM and GM groups. Table 4 presents the parameter estimates of the Probit models. Columns (i) to (iii) are results for the likelihood ratio test, and column (iv) for the t-test. Here, the model is far more parsimonious; this is due to the fact that the non-GM and GM groups are pooled (columns (iii) and (iv)). Since the non-GM and GM groups have different criteria as revealed in table 3, we drop all the insignificant variables and focus on the effect of initial choice between non-GM and GM alternatives. As the table shows, the results on the coefficient estimates are consistent with

the results in table 3. The price difference is highly significant as before. The likelihood ratio test statistic is 16.645, which rejects the restriction at the 5% level (p-value=0.020). The t-test in this case supports the effect in question is statistically significant. In particular, it indicates that the initial GM choosers are less likely to stay with the initial choice; that is, they are more likely to switch to the other alternative at any given level of financial incentive. This indicates that there are fewer steadfast supporters of GM foods in the GM camp than the counterpart in the non-GM camp. The exact reason for this observation is not very clear from our analysis. It is possible that there are some non-GM choosers who will never switch to the GM alternative, but there are few, if any, consumers who are committed to the GM alternative at the same level of enthusiasm.

4 Conclusion Remarks

We conducted a national telephone survey in Taiwan in 2003, asking for preference on the choice between non-GM and GM vegetable oil. The survey showed that the Taiwanese consumers had positive attitudes toward GM foods: the acceptance of GM foods was even higher than in the United States (Chern, Rickertsen, Tsuboi, and Fu, 2003). The higher acceptance is consistent with some of the prior surveys conducted in China (Li, Curtis, McCluskey, and Wahl, 2002). However, the low level of knowledge among Taiwanese consumers suggests some uncertainty over the development of future acceptance of GM foods among Taiwanese consumers. It is not very clear if higher knowledge leads to higher acceptance if the level of knowledge rises in the future. The prior results in the literature and our results suggest, rather, that knowledge is not the most important factor of consumer choice, at least in the short run: more important is how consumers perceive the products, perhaps based on the limited information and personal experiences.

The paired-choice contingent valuation question allowed us to examine if the price hike on the chosen alternative has the same effect as the price discount on the forgone alternative. The result is somewhat inconclusive, but we maintain the hypothesis that they have a differential effect. The implication of our result to the valuation exercise is that if the population is expected to consist of a large percentage of non-GM advocates, the use of discount is more appropriate because discount encourages switches. Our design is particularly apt to the use of discount because the selected

product is available at the initial price, which should minimize the possibility of respondents' indignation.

We finally examined the effect of initial non-GM/GM choice on the degree of commitment to the selected alternative. We found that the non-GM choosers were less likely to desert the initial position than the GM choosers. The practical implication of this finding is that the GM products must maintain lower price in order to keep their customers while the non-GM customers are more likely to absorb a small amount of price increase before switching to the GM counterparts: that is, it is possible to harvest on the willingness to pay a premium on the non-GM foods. It is not known whether the second-generation GM foods with consumer benefits can entertain the same kind of loyalty exhibited a group of non-GM users.

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Endnotes

[1]The survey was conducted as part of the larger project of multi-country comparison of consumer attitudes in the U.S., Taiwan, Japan, and Norway. This paper reports only the results from the Taiwanese survey. A uniform survey instrument was developed and adapted to the local languages.

[2]The questionnaire includes three products: vegetable oil, tofu, and salmon. We use the results from vegetable oil in this paper.

[3]There is a second follow-up question as in the triple-bounded DC format, but we do not use this information in this paper.

[4]This feature is common to any choice experiment, which necessarily elicit the marginal willingness to pay for a unit change in some attribute of the evaluated good.

[5]The reduced pesticide use in crop production is an environmental benefit, but it is also a benefit to human health in that the risk of pesticide residue is reduced.

Appendix

Stated Choice Question

Initial Question

Now, imagine that on your next shopping trip that you want to buy some vegetable oil and there are only two kinds of oil available, both made with soybeans.

The first type is a non-GM oil and costs NT$90. Less than 3% of the soybeans used to make this oil were genetically modified. Since it is nearly impossible to ensure a food product is absolutely free from GM content, the government allows a food product to be called non-GM if its GM content is no more than 3%.

The other type is a GM oil and also costs NT$90. 90% or more of the soybeans used to make this oil were genetically modified.

Given that the two oils have the same price, Would you . . .

(1) choose the Non-GM oil,

(2) choose the GM oil,

(3) would you consider both Non-GM oil and GM oil as equally good, or

(4) consider neither Non-GM oil nor GM oil attractive?

(9) Don't know (not explicitly provided but admitted if volunteered).

Follow-up Question

Suppose that, the non-GM oil costs NT$ [random amount] while the GM oil costs NT$ [random amount]. Now would you . . .

(1) choose the non-GM oil or

(2) choose the GM oil?

(9) Don't know.

Description of Genetically Modified Foods

Genetically modified foods are foods from plants, fish or animals whose genetic blueprint has been modified by scientists to enhance desirable traits. For example, scientists have developed plants and animals that can grow faster

Genetically modified foods have been controversial. The following are some pros and cons of genetically modified foods.

Some advantages of genetically modified organisms are:

> Crops may require less herbicides or pesticides, foods may be richer in vitamins or minerals, may contain less fat, and they may be cheaper.

Some disadvantages of genetically modified organisms are:

> They may create new allergies, weeds and bugs may become resistant to herbicides and pesticides, the variety of foods may decrease, and genetic engineering may violate some people's religious or ethical beliefs.

True or False Questions

1. By eating GM foods, a person's genes could be altered.
2. Genetic modification technology has been used to create soybeans that are tolerant of herbicides or resistant to pests.
3. Fish contain DNA, but corn does not.

Table 1: Definition and Sample Statistics of Key Variables.

Variable	Definition	(i) Non-GM Choosers	(ii) GM Choosers	(iii) Indifferent Respondents	(iv) All Respondents
Y1	1 if one chooses non-GM; 0 if one chooses GM.	0.829	0.278	0.356	0.356
		(0.377)	(0.449)	(0.483)	(0.483)
Y2	1 if one does not change alternatives; 0 if one switches alternatives.	0.814	0.718		
		(0.390)	(0.451)		
KNOW	1 if very well or somewhat informed about GM foods; 0 otherwise.	0.584	0.366	0.477	0.477
		(0.494)	(0.483)	(0.503)	(0.503)
TF	1 if one gives correct answer to all of the objective knowledge questions; 0 otherwise.	0.117	0.110	0.169	0.169
		(0.322)	(0.314)	(0.377)	(0.377)
RP1	1 if GM food is extremely/somewhat risky to human health; 0 otherwise.	0.635	0.126	0.306	0.306
		(0.483)	(0.333)	(0.465)	(0.465)
RP2	1 if GM food is extremely/somewhat safe to human health; 0 otherwise.	0.257	0.741	0.532	0.532
		(0.438)	(0.439)	(0.503)	(0.503)
PEST1	1 if extremely/somewhat willing to consume GM food if it reduces pesticide use; 0 otherwise.	0.573	0.890	0.783	0.783
		(0.496)	(0.314)	(0.415)	(0.415)
PEST2	1 if extremely/somewhat unwilling to consume GM food if it reduces pesticide use; 0 otherwise.	0.401	0.086	0.188	0.188
		(0.491)	(0.281)	(0.394)	(0.394)
NUT1	1 if extremely/somewhat willing to consume GM food if it is more nutritious; 0 otherwise.	0.522	0.827	0.786	0.786
		(0.500)	(0.379)	(0.413)	(0.413)
NUT2	1 if extremely/somewhat unwilling to consume GM food if it is more nutritious; 0 otherwise.	0.453	0.111	0.157	0.157
		(0.499)	(0.315)	(0.367)	(0.367)
ALG1	1 if extremely/somewhat willing to consume GM food if it causes allergy; 0 otherwise.	0.109	0.307	0.386	0.386
		(0.313)	(0.463)	(0.490)	(0.490)
ALG2	1 if extremely/somewhat unwilling to consume GM food if it causes allergy; 0 otherwise.	0.854	0.601	0.571	0.571
		(0.354)	(0.491)	(0.498)	(0.498)
REL1	1 if ethical/religious concerns are extremely or somewhat important; 0 otherwise.	0.210	0.114	0.103	0.103
		(0.408)	(0.319)	(0.306)	(0.306)
REL2	1 if ethical/religious concerns are extremely or somewhat unimportant; 0 otherwise.	0.779	0.848	0.868	0.868
		(0.415)	(0.360)	(0.341)	(0.341)
AGE	One's age in years	40.515	45.331	41.394	41.394
		(10.907)	(12.575)	(14.534)	(14.534)
FEMALE	1 if female; 0 if male.	0.682	0.724	0.634	0.634
		(0.466)	(0.448)	(0.485)	(0.485)
COLLEGE	1 if one's educational achievement is bachelor's degree or higher; 0 otherwise.	0.204	0.104	0.254	0.254
		(0.404)	(0.307)	(0.438)	(0.438)
EXPFAH	Average expenditure on food at home per grocery shopping (in NT$).	4.280	4.217	5.892	5.892
		(4.872)	(7.146)	(11.790)	(11.790)
N		274	163	71	508

[a] Number of observations.

Note: Parenthesized are standard deviations.

Table 2: Determinants of Choice of Non-GM and GM over Indifference.

Variable	(i) Non-GM vs. Indiff.		(ii) GM vs. Indiff.	
Constant	0.235		0.156	
	(0.724)		(0.730)	
RP1	0.373	*	-0.464	
	(0.222)		(0.294)	
RP2	0.120		0.745	***
	(0.238)		(0.257)	
PEST1	0.257		0.252	
	(0.447)		(0.594)	
PEST2	0.373		-0.257	
	(0.450)		(0.637)	
NUTR1	0.779	**	0.126	
	(0.388)		(0.392)	
NUTR2	1.039	***	0.069	
	(0.392)		(0.440)	
ALG1	-0.511		-0.662	*
	(0.412)		(0.401)	
ALG2	-0.060		-0.528	
	(0.392)		(0.385)	
AGE	-0.021	***	-0.004	
	(0.007)		(0.007)	
FEMALE	-0.024		0.240	
	(0.158)		(0.198)	
COLLEGE	-0.168		-0.581	**
	(0.176)		(0.243)	
EXPFAH	-0.017	*	-0.013	
	(0.010)		(0.009)	
Log-likelihood	-202.079		-139.951	
McFadden's R^2	0.091		0.180	
N[a]	350		247	

[a] Number of observations.

Note: Parenthesized are estimated standard errors. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. Column (i) excludes GM choosers while column (ii) excludes non-GM choosers.

Table 3: The Determinants of Choice between Non-GM and GM.

Variable	(i) NG		(ii) GM	
Constant	-2.761	*	0.357	
	(1.416)		(1.314)	
KNOW	-0.083		0.167	
	(0.254)		(0.295)	
TF	-0.418		-0.038	
	(0.352)		(0.418)	
RP1	0.775	**	0.146	
	(0.351)		(0.573)	
RP2	0.341		-0.668	
	(0.369)		(0.447)	
REL1	2.542	***	-0.446	
	(0.971)		(0.950)	
REL2	1.671	*	-0.101	
	(0.882)		(0.860)	
ALG1	0.369		0.112	
	(0.562)		(0.647)	
ALG2	1.033	**	0.240	
	(0.519)		(0.591)	
NUT1	0.391		0.276	
	(0.728)		(0.683)	
NUT2	0.790		0.515	
	(0.729)		(0.795)	
PEST1	0.112		-0.988	**
	(0.292)		(0.492)	
AGE	0.016		-0.013	
	(0.012)		(0.014)	
FEMALE	0.299		-0.319	
	(0.252)		(0.376)	
MARITAL	-0.020		-0.516	
	(0.322)		(0.469)	
COLLEGE	0.507		0.231	
	(0.325)		(0.469)	
EXPFAH	-0.018		0.036	
	(0.020)		(0.030)	
ΔP	-0.022	***	-0.042	***
	(0.009)		(0.010)	
DISC	-0.194		-0.140	
	(0.242)		(0.325)	
Log-likelihood	-76.502		-56.814	
McFadden's R^2	0.259		0.242	
N[a]	222		120	

[a] Number of observations.

Note: Parenthesized are estimated standard errors. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Table 4: Effects of Non-GM/GM choice on the Commitment to the Selected Alternative.

	(i) NG Choosers		(ii) GM Choosers		(iii) NG & GM Choosers		(iv) NG & GM Choosers	
Variable								
Constant	0.851		0.909	*	0.903	**	1.029	***
	(0.589)		(0.486)		(0.365)		(0.374)	
RP1	-0.578		0.620	***	0.533	***	0.371	**
	(0.375)		(0.208)		(0.162)		(0.181)	
AGE	0.016		0.009		0.011		0.013	*
	(0.010)		(0.010)		(0.007)		(0.007)	
FEMALE	0.219		0.278		0.190		0.249	
	(0.300)		(0.215)		(0.167)		(0.170)	
EXPFAH	-0.017		-0.034	**	-0.027	**	-0.028	**
	(0.020)		(0.015)		(0.013)		(0.013)	
ΔP	-0.038	***	-0.018	***	-0.025	***	-0.026	***
	(0.008)		(0.007)		(0.005)		(0.005)	
GM							-0.387	**
							(0.178)	
Log-likelihood	-68.261		-97.793		-174.377		-171.995	
McFadden's R^2	0.173		0.126		0.122		0.134	
N	132		235		367		367	

[a] Number of observations.

Note: Parenthesized are estimated standard errors. The symbols *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.