

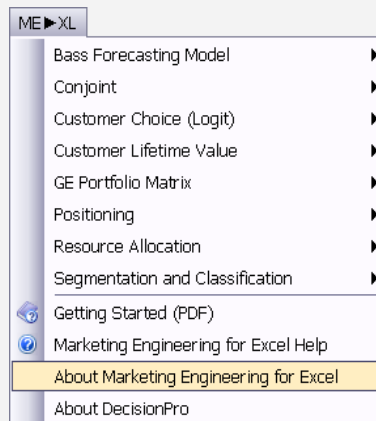
# Tutorial

## Customer Choice (Logit)



*Marketing Engineering for Excel* is a *Microsoft Excel* add-in. The software runs from within *Microsoft Excel* and only with data contained in an *Excel* spreadsheet.

After installing the software, simply open *Microsoft Excel*. A new menu appears, called "ME ▶XL." This tutorial refers to the "ME ▶XL/*Customer Choice (Logit)*" submenu.



### Overview

The customer choice (logit) model is an individual-level response model that helps analyze and explain the choices individual customers make in a market. The customer choice model helps firms understand the extent to which factors such as the price of a brand or its ease of installation influence a customer's choice. A brand's purchase probability at the individual level can be aggregated to determine the brand's market share at the market level.

Firms also can use customer choice analysis to develop marketing programs tailored to specific market segments, or even to individual customers.

Further, if a company has purchase data about its products versus those of its competitors (product choice data), as well as some observed independent variables (e.g., gender, price, promotion), it can use customer choice modeling to answer such questions as:

- ✓ Does a customer's gender influence his or her purchase decision regarding our product(s)?
- ✓ Do competitor's promotions affect the purchase of our product(s)?
- ✓ How do our promotions affect our sales rates?

## Getting Started

Customer choice analysis allows you to use your own data directly or to use a preformatted template.

Because customer choice models require a specific data format, users with their own data should to review the preformatted template to learn about the appropriate structure.



This section explains how to create an easy-to-use template to enter your own data.

If you want to run customer choice analysis immediately, open the example file "OfficeStar Data (Customer Choice).xls" and jump to "Step 2: Running analysis." By default, the example files install in "My Documents/My Marketing Engineering/."

## Step 1 Creating a template

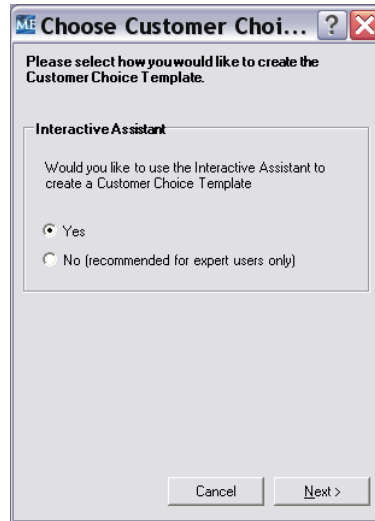
### Using the interactive assistant

In Excel, if you click on ME ▶ XL → CUSTOMER CHOICE (LOGIT) → CREATE TEMPLATE, a dialog box will appear. This box represents the first step in creating a template for running the customer choice model. The first dialog box prompts you to use the interactive assistant.

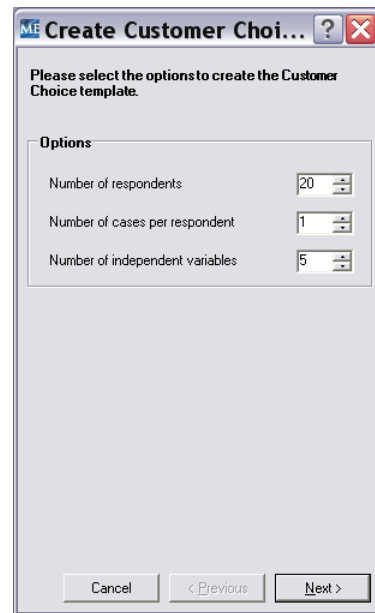
Marketing Engineering for Excel models allow you to use the interactive assistant, which will prompt you to enter the parameters required by the model and build a template spreadsheet for you to enter the required data. This generated template includes pre-selected cell ranges that correspond to the parameters you enter. We recommend that you use Marketing Engineering for Excel templates to simplify subsequent analyses.

Expert users who are familiar with Marketing Engineering for Excel models and data requirements may prefer to input data directly in an unformatted spreadsheet. Such users should begin with the interactive assistant to become familiar with the data format that Marketing Engineering for Excel expects.

Unless you are already familiar with the methodology, you should select "yes" in response to the box that asks whether you want to use the interactive assistant.



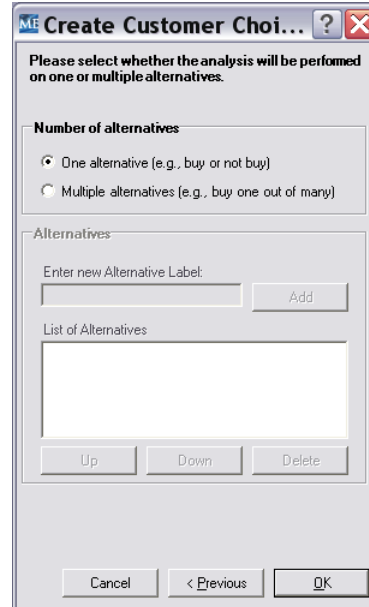
With the interactive assistant, the following dialog box allows you to create a template to run the customer choice software. All customer choice models require at least one case per respondent (customer) and at least one independent variable.



The options are as follows:

- **Number of respondents:** The total number of respondents (customers) in your study.
- **Number of cases per respondent:** The number of observations per respondent (one or more than one purchase event).
- **Number of independent variables:** The number of independent variables you collected or observed during the study, such as respondent gender, product on sale, and so forth.

After completing the dialog box, click Next to move to the subsequent dialog box and define the customer choice template further.



There are two types of data that can be used in customer choice analysis:

- **One alternative** (Binary choice model). This data format is suitable when customers have two choice alternatives, such as a choice between “buy” and “don’t buy.” That is, it requires a yes-no decision process.
- **Multiple alternatives** (Multinomial choice model). This data format considers customer choices across a subset of related competitors, such as brands A, B, and C. Therefore, it requires a one-out-of-many decision process.

If you select the multiple alternatives option, you will activate the lower portion of the dialog box, which allows you to enter the labels you want to use to describe the various alternatives. In the box labeled “Enter new Alternative Label,” enter the label for the first alternative, then click the Add button. The alternative label appears in the list, as shown below:



Repeat the process of adding options until you have entered all the desired labels. You may use the Up, Down, or Delete buttons to modify your list by simply selecting any item within the list.

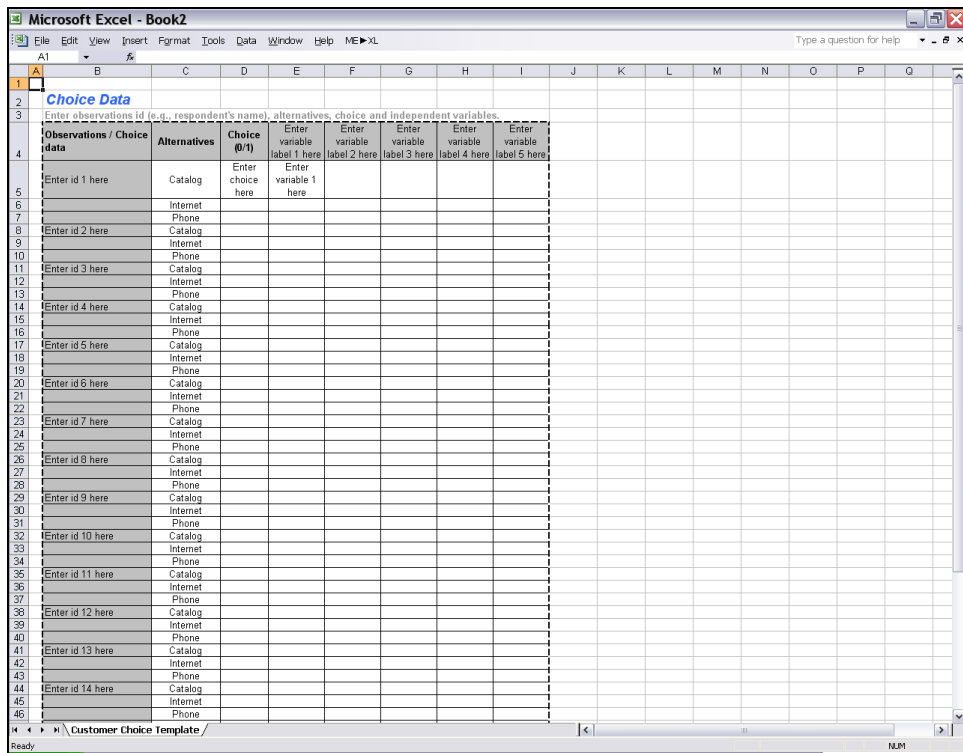
If you specified the "Single alternative" model, the labels will automatically be designated as "Response" (when the alternative is chosen) and "Dummy" (when the alternative is not chosen).



If your data require a "no choice" option, you may specify it yourself. If you do not specify a label for the no-choice option, the software will add this option automatically during the analysis.

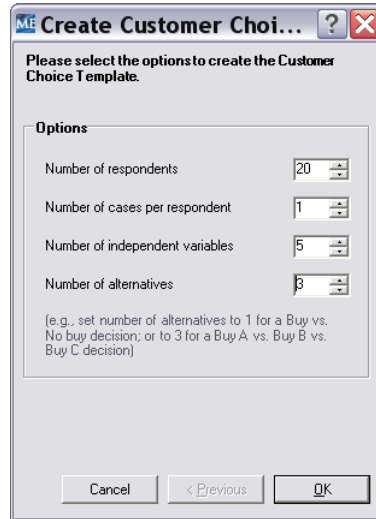
For example, if customers must choose among three brands, A, B, and C, and some choose none of the options, the choice process actually involves four options (A, B, C, and none). The software identifies this issue and adds the fourth option (called a dummy) automatically. Alternatively, you may specify the four options manually.

After entering all the alternatives, click OK to generate the data collection template, as shown below:



## Not using the interactive assistant

If you decide not to use the interactive assistant, the following dialog box appears:

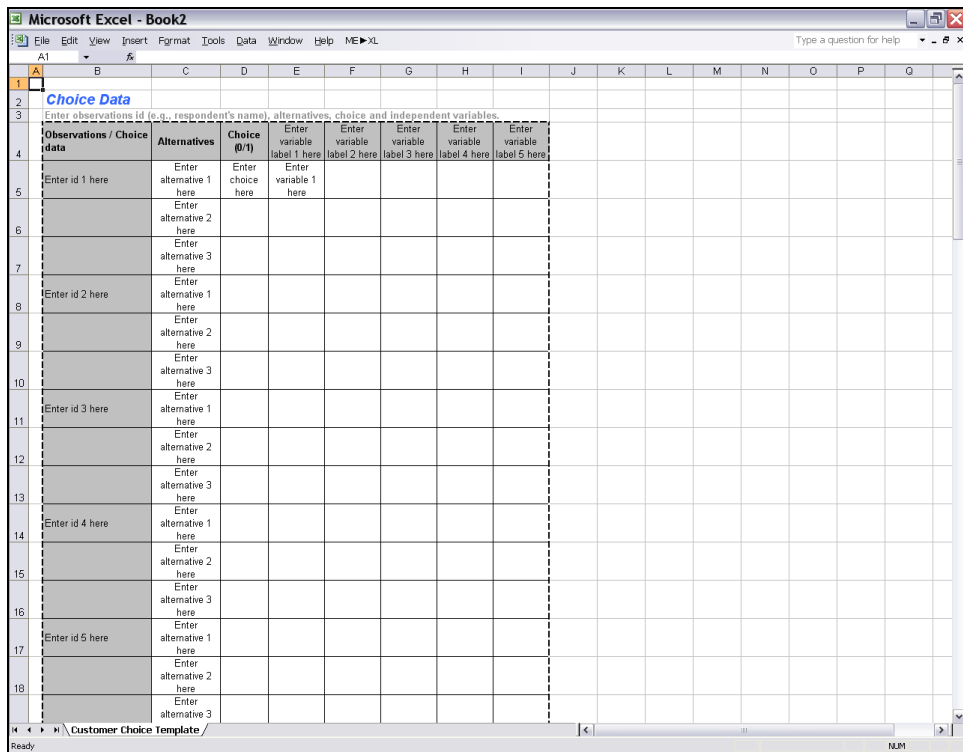


The dialog box is titled "Create Customer Choice Template" and contains the following options:

- Number of respondents: 20
- Number of cases per respondent: 1
- Number of independent variables: 5
- Number of alternatives: 3

Below the options, there is a note: "(e.g., set number of alternatives to 1 for a Buy vs. No buy decision; or to 3 for a Buy A vs. Buy B vs. Buy C decision)". At the bottom, there are three buttons: "Cancel", "< Previous", and "OK".

You should use the Marketing Engineering for Excel templates whenever possible; for example, the preceding dialog box allows you to specify the parameters to use to build your template, but you must fill in the resultant generated spreadsheet manually.



The spreadsheet is titled "Microsoft Excel - Book2" and shows a template for customer choice data. The columns are labeled as follows:

- Column A: Observations / Choice data
- Column B: Alternatives
- Column C: Choice (0/1)
- Column D: Enter variable label 1 here
- Column E: Enter variable label 2 here
- Column F: Enter variable label 3 here
- Column G: Enter variable label 4 here
- Column H: Enter variable label 5 here

The rows are numbered 1 through 18. Row 1 is the header row. Rows 2-3 contain instructions. Rows 4-18 are data rows, each starting with "Enter id X here" in column A, followed by "Enter alternative X here" in column B, and "Enter choice here" in column C. The remaining columns (D-H) are empty for data entry.

## Step 2 Entering your data



In this tutorial, we use the example file "OfficeStar Data (Customer Choice).xls," which by default appears in "My Documents/My Marketing Engineering/."

To view a proper data format, open that spreadsheet in Excel. A snapshot is reproduced below.

Observations / Choice data	Alternatives	Choice (0/1)	Past purchases	Expensive	Convenient	Service	Large choice
Respondent 1	OfficeStar	0	0	2	1	3	4
	Paper & Co	0	0	4	4	7	3
	Office Equip/nt	1	0	1	3	5	1
Respondent 2	OfficeStar	1	0	3	2	5	6
	Paper & Co	0	0	7	4	6	7
	Office Equip/nt	0	0	5	5	5	7
Respondent 3	OfficeStar	1	0	3	3	3	6
	Paper & Co	0	0	7	2	1	1
	Office Equip/nt	0	0	5	2	1	7
Respondent 4	OfficeStar	0	0	1	7	7	4
	Paper & Co	1	8	3	4	7	7
	Office Equip/nt	0	0	6	5	2	1
Respondent 5	OfficeStar	0	0	5	2	2	4
	Paper & Co	1	0	1	3	3	4
	Office Equip/nt	0	0	7	1	2	7
Respondent 6	OfficeStar	1	0	7	6	4	3
	Paper & Co	0	0	5	5	2	3
	Office Equip/nt	0	0	5	2	6	2
Respondent 7	OfficeStar	0	0	5	2	7	4
	Paper & Co	1	0	4	4	3	4
	Office Equip/nt	0	0	1	7	5	2
Respondent 8	OfficeStar	1	0	1	7	3	6
	Paper & Co	0	0	3	6	2	4
	Office Equip/nt	0	0	5	1	1	7
Respondent 9	OfficeStar	1	0	4	4	4	4
	Paper & Co	0	0	4	3	3	6
	Office Equip/nt	0	0	1	4	4	1
Respondent 10	OfficeStar	1	0	3	2	3	2
	Paper & Co	0	0	7	3	1	4
	Office Equip/nt	0	0	1	5	5	1
Respondent 11	OfficeStar	0	0	2	2	3	3
	Paper & Co	1	5	3	2	6	3
	Office Equip/nt	0	0	4	7	2	3
Respondent 12	OfficeStar	0	0	3	2	1	2
	Paper & Co	0	0	2	6	3	3
	Office Equip/nt	1	8	5	5	3	6
Respondent 13	OfficeStar	1	0	2	5	1	3
	Paper & Co	0	0	3	2	5	6
	Office Equip/nt	0	0	6	2	2	6
Respondent 14	OfficeStar	1	0	1	4	1	7
	Paper & Co	0	0	1	1	7	3
	Office Equip/nt	0	0	5	7	3	7
Respondent 15	OfficeStar	1	0	1	7	7	7
	Paper & Co	0	0	6	5	4	2
	Office Equip/nt	0	8	1	6	5	1

For each respondent, a customer choice spreadsheet contains:

- **Alternative names** for each product in the study. If the spreadsheet was generated using the single alternative option, this column is not present.
- **Cases.** The same customer might have been exposed to the same choice situation, repeatedly, and these repetitions assist model estimation. If the spreadsheet was generated using the one case per respondent option, this column is not present.
- **Choice** variables. The alternative the customer chose receives a value of 1; all other alternatives receive values of 0. Only one "1" can exist per case. If all options are set to 0, a none-of-the-above option (dummy) is automatically inserted during the analysis.
- **Independent variables.** A column represents each variable specified for the study, and all independent variables should have consistent value ranges. That is, the data for a single independent variable should be scaled within the same range. Independent variables can take on discrete values if they are appropriately specified using dummy-variable coding.

## Step 3 Running analyses

After you enter your data in an Excel spreadsheet with the appropriate format, click on ME►XL → CUSTOMER CHOICE (LOGIT) → RUN ANALYSIS. The dialog box that appears allows you to set the options to perform the customer choice analysis of your data.

The four sections in this dialog box control the customer choice analysis.

**ME Customer Choice Analysis**

Please select options for Customer Choice

**Data**

- First column contains respondents' ids
- More than 1 case per respondent
- More than 1 alternative per case
- Generate alternative-specific constants

**Options**

Significance level (%): 5

- Perform analysis on holdout sample
- As a percentage of dataset (%) 10
- Last case of each respondent

**Latent Class Options**

Maximum number of segments in analysis: 1

**Next Steps**

Next, you will be asked to select Cell Range for Customer Choice Data.

- Save choices in current spreadsheet

Advanced > Cancel Next >

### Data

In this portion of the dialog box, you must indicate which data are present in the spreadsheet. If you have used the interactive assistant, the software automatically clicks the appropriate check boxes. If you are using a custom spreadsheet, you will need to select the appropriate check boxes to indicate which data are present.

- **Generate Alternative-Specific Constants.** In general, it is a good idea to include alternative-specific constants in the model. If you check this option, the program will automatically generate the dummy variables for alternative-specific constants. For estimation purposes, the last listed alternative in the data is set to the base value of 0. The alternative-specific constants for the other alternatives are estimated with respect to this base.



- **Significance level.** Expressed in percentage terms, this option refers to the significance level of the statistical tests. The software uses this value to identify statistically significant coefficients from the analysis.
- **Perform analysis on holdout sample.** This option allows you to specify a number between 0 and 100 (0 is the default) to represent the percentage of the data you want to use as a holdout sample to assess the predictive validity of the model. If you choose this option, the customer choice analysis selects the closest feasible sample with a size equal to, or smaller than, the percentage you specify. For example, if you have 110 customers (cases) with one observation per customer and you specify 15%, the program sets aside the last 16 observations in the data file as the holdout sample and estimate the model using the first 94 customers.

### Latent Class Options

In this portion of the dialog box, you may indicate the maximum number of segments which ME►XL should consider. The default number of segments is set to 1 which is the most common option. If you have reason to believe your data may have multiple "latent" segments, you may select a number greater than 1. In the step that follows, you will be able to review the attributes of each segment and decide how many segments to include in the analysis.

Note that for the latent class analysis to be executed, you need a sufficient number of respondents, so that even small segments, if they occur (say a segment that is about 5% of your sample), will still have a reasonable number of respondents in that segment (say 20 or more respondents). Note: The OfficeStar example used for this tutorial does not include the data necessary to use the Latent Class option.

### Advanced Menu

When using the Latent Class option, it may be necessary to further control the evaluation criteria from the normal software defaults. Clicking the Advanced button will produce the following expanded dialog box:

The screenshot shows the 'ME Customer Choice Analysis' dialog box with the 'Advanced' button selected. The dialog is titled 'Please select options for Customer Choice' and is divided into several sections:

- Data:**
  - First column contains respondents' ids
  - More than 1 case per respondent
  - More than 1 alternative per case
  - Generate alternative-specific constants
- Options:**
  - Significance level (%): 5
  - Perform analysis on holdout sample
    - As a percentage of dataset (%): 10
    - Last case of each respondent
- Latent Class Options:**
  - Maximum number of segments in analysis: 1
- Next Steps:**
  - Next, you will be asked to select Cell Range for Customer Choice Data.
  - Save choices in current spreadsheet
- Latent Class Estimation Options:**
  - E steps: 30
  - M steps: 1500
  - Log Likelihood tolerance: 0.00100000000000
  - Gradient tolerance: 0.00100000000000
  - Parameter tolerance: 0.00010000000000
  - Objective tolerance: 0.00100000000000
  - Number of runs: 1

Buttons at the bottom include '< Advanced', 'Cancel', and 'Next >'.

## Latent Class Estimation Options

Latent Class analysis is implemented in ME►XL via the EM algorithm. EM (Expectation Maximization) is an iterative technique in which, in each iteration, the procedure predicts the unobserved latent classes (in the E-step) and based on these predictions re-estimates the parameters (in the M-step). The controls below allow user to influence the execution of the program. Typically the tolerance levels can be 0.001. The program uses several criteria to evaluate whether to terminate, including how fast the likelihood function is converging, and how fast the coefficients of the model are converging.

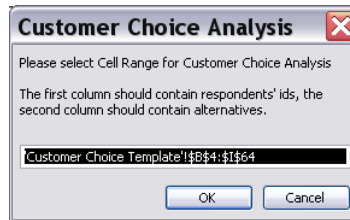
**E steps:** Specifies the number of expectation steps.

**M steps:** Specifies the number of maximization steps.

**Log Likelihood, Gradient, Parameter and Objective Tolerances:** These parameters control the tolerances within the analysis. If a data set is not converging, the user should increase the tolerance levels to gain better insight about the data. Note that decreasing tolerance levels will increase the required processing time.

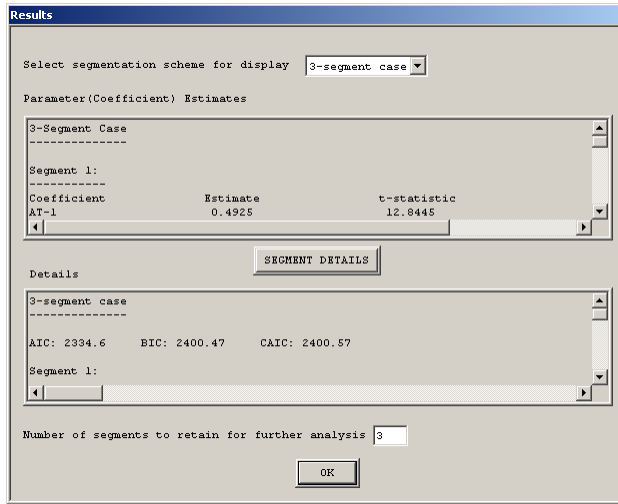
**Multiple Runs?:** In many cases, it will be necessary to make multiple runs of the same data to determine whether a true latent class exists. This parameter will allow you to re-run the model "n" times, and select the best results from those runs.

After selecting the desired options, click Next. The software will ask you to select the data on which to perform the analysis.



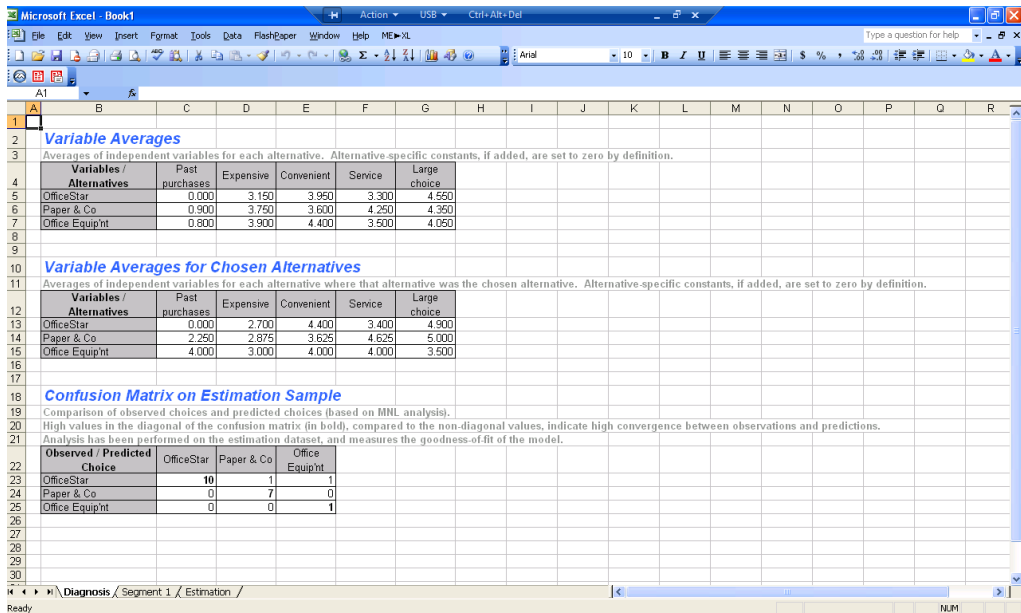
### Optional Screen if Latent Class Option was Selected

If you changed the number of segments in Latent Class Options to greater than 1, the following dialog box will appear. With this dialog box, you can review the diagnostic properties associated with each number of segments, up to the maximum number of segments you specified. Use the drop down arrow to select segment scheme to be displayed. In the two sections of the screen, use the scroll arrows to view all of the coefficient estimates for each segment. The bottom part of this screen allows you to select how many segments you wish to retain for analysis. Note: Latent Class will identify potential clusters (segments). Numerous runs may be required before one can establish clusters of importance.



## Step 4 Interpreting the results

The generated workbook contains several worksheets that describe the analysis.



## Variable Averages

This portion of the spreadsheet presents the means of each independent variable for the group of respondents.

## Variable Averages for Chosen Alternatives

This portion of the spreadsheet presents the means of each independent variable where that alternative was the chosen alternative.

## Confusion Matrix on Estimation Sample

The confusion matrix portion of the spreadsheet includes two matrices: numerical counts and percentages for the same data.

The diagonal of both matrices appears bolded, to highlight the convergence of the observed and predicted data. A high value or percentage at this diagonal intersection represents a high correlation between observed and predicted behavior.

Book7									
A	B	C	D	E	F	G	H	I	J
1									
2	<b>Coefficient Estimates [segment 1]</b>								
3	Coefficient estimates of the Choice model. Coefficients in bold are statistically significant.								
4	<b>Variables / Coefficient estimates</b>	<b>Coefficient estimates</b>	<b>Standard deviation</b>	<b>t-statistic</b>					
5	Past purchases	<b>0.863569</b>	0.359493	2.402184					
6	Expensive	<b>-0.81508</b>	0.383513	-2.12529					
7	Convenient	0.537433	0.373534	1.438779					
8	Service	0.166118	0.255744	0.649551					
9	Large choice	0.4312	0.32222	1.338216					
10	Const-1	4.391705	1.933972	2.270821					
11	Const-2	3.600351	1.805345	1.994273					
12	Baseline		n/a	n/a					
13									
14									
15	<b>Elasticities [segment 1]</b>								
16	Elasticities of coefficients								
17	<b>Elasticities of Past purchases</b>	OfficeStar	Paper & Co	Office Equip't					
18	OfficeStar	0	0	0					
19	Paper & Co	-0.06699	0.084338	-0.00238					
20	Office Equip't	-0.14645	-0.1145	1.190273					
21									
22	<b>Elasticities of Expensive</b>	OfficeStar	Paper & Co	Office Equip't					

## Coefficient Estimates

This portion of the spreadsheet shows the coefficients associated with each independent variable. Coefficients that are significantly different from 0 (at the level of significance specified during the Run Analysis set up) appear in **bold**; they are in **green** when positive (positive influence on the likelihood of choice) and in **red** when negative.

In the OfficeStar example, *past purchases* has a positive influence on the likelihood of choice (a customer is more likely to return to a store that he or she has patronized in the past), whereas *expensive* has a negative impact (people who perceive a store as expensive avoid it).

## Elasticities

This portion reveals the elasticities of each independent variable in the study. The matrix provides information about the elasticity of impact that each variable has on choice shares. For a 1% change in an attribute in a given row, the elasticity equals the percentage change expected in the response to that alternative. Large values mean that changes in the variable represented in that row have significant effects on the choice probabilities of the choice alternatives in a specific column. The bolded cells on the diagonal indicate the effect of a product change on that product, whereas the off-diagonal cells reflect the effects of the same product change on a competitor's product.

In the OfficeStar example, service elasticity (.14) is rather small (compared with other elasticities that appear in the diagonal of each elasticity matrix), so improving perceptions of service quality by 1% would have a limited impact on the likelihood of customer purchase from OfficeStar (i.e., .14%). However, the greater service elasticity for a competitor, Office Equipment (.42), suggests that this competitor would benefit much more than OfficeStar if it managed to improve customers' perceptions of its service quality. The off-diagonal elements represent cross-elasticities.

The off-diagonal elements reveal the influence on competitors created by changes in customer perceptions.

Book7										
A	B	C	D	E	F	G	H	I	J	K
1										
2	<b>Estimation Sample Details</b>									
3	Choice probabilities, predicted and observed choices, segment membership probabilities and predicted segment for the sample used to estimate the model.									
4	<b>Respondents / Choice probabilities</b>	<b>OfficeStar probability</b>	<b>Paper &amp; Co probability</b>	<b>Office Equip't probability</b>	<b>Predicted OfficeStar</b>	<b>Predicted Paper &amp; Co</b>	<b>Predicted Office Equip't</b>	<b>Observed OfficeStar</b>	<b>Observed Paper &amp; Co</b>	<b>Observed Office Equip't</b>
5	Respondent 1	0.628	0.353	0.020	1	0	0	0	0	1
6	Respondent 2	0.900	0.083	0.017	1	0	0	1	0	0
7	Respondent 3	0.998	0.001	0.002	1	0	0	1	0	0
8	Respondent 4	0.015	0.985	0.000	0	1	0	0	1	0
9	Respondent 5	0.040	0.960	0.000	0	1	0	0	1	0
10	Respondent 6	0.506	0.491	0.003	1	0	0	1	0	0
11	Respondent 7	0.251	0.388	0.361	0	1	0	0	1	0
12	Respondent 8	0.982	0.018	0.000	1	0	0	1	0	0
13	Respondent 9	0.637	0.338	0.025	1	0	0	1	0	0
14	Respondent 10	0.748	0.038	0.215	1	0	0	1	0	0
15	Respondent 11	0.039	0.960	0.001	0	1	0	0	1	0
16	Respondent 12	0.009	0.164	0.827	0	0	1	0	0	1
17	Respondent 13	0.779	0.221	0.000	1	0	0	1	0	0
18	Respondent 14	0.955	0.042	0.003	1	0	0	1	0	0
19	Respondent 15	0.719	0.000	0.281	1	0	0	1	0	0
20	Respondent 16	0.689	0.322	0.009	1	0	0	0	1	0
21	Respondent 17	0.088	0.904	0.008	0	1	0	0	1	0
22	Respondent 18	0.879	0.117	0.004	1	0	0	1	0	0
23	Respondent 19	0.051	0.725	0.224	0	1	0	0	1	0
24	Respondent 20	0.100	0.000	0.000	0	1	0	0	1	0

### Estimated Choice Probabilities

This portion of the above spreadsheet shows the probabilities of segment membership in each segment, the choice alternative that the model predicts will be chosen by that respondent, and the observed choice for each respondent in your study. The matrix will show all respondents unless you selected the "Perform analysis on holdout sample" option. In this case, this matrix shows only the results for the holdout sample.

## Step 4a Interpreting the results when using Latent Class option

When using the Latent Class option, several screens will differ from those produced when not using the Latent Class option. Notably, a worksheet will be produced for each segment analyzed, as shown below.

Note: The OfficeStar example used for this tutorial does not include the data necessary to use the Latent Class option.

A	B	C	D	E	F	G	H	I
<b>Coefficient Estimates [segment 1]</b>								
Coefficient estimates of the Choice model. Coefficients in bold are statistically significant.								
Variables / Coefficient estimates	Coefficient estimates	Standard deviation	t-statistic					
AT-1	<b>0.498501</b>	0.035037	14.22771					
AT-2	<b>0.536074</b>	0.035696	15.01794					
AT-3	<b>-1.02803</b>	0.057895	-17.7568					
Baseline		n/a	n/a					

The Hold-out worksheet will show the details of the analysis for the hold-out sample.

Hold-out Sample Details																
Choice probabilities, predicted and observed choices, segment membership probabilities and predicted segment for the hold-out sample.																
Respondents / Choice probabilities	A probability	B probability	C probability	D probability	Predicted A	Predicted B	Predicted C	Predicted D	Observed A	Observed B	Observed C	Observed D	Segment 1 probability	Segment 2 probability	Predicted segment	
1001 / Obs 10	0.395	0.240	0.215	0.150	1	0	0	0	1	0	0	0	0	0.001	0.999	2
1002 / Obs 10	0.182	0.485	0.299	0.034	0	1	0	0	1	0	0	0	0	0.000	1.000	2
1003 / Obs 10	0.614	0.092	0.072	0.223	1	0	0	0	0	0	0	0	1	0.004	0.996	2
1004 / Obs 10	0.143	0.653	0.106	0.198	0	1	0	0	0	1	0	0	0	0.000	1.000	2
1005 / Obs 10	0.438	0.189	0.217	0.156	1	0	0	0	1	0	0	0	0	0.007	0.993	2
1006 / Obs 10	0.291	0.115	0.192	0.403	0	0	0	1	0	0	0	0	1	0.003	0.997	2
1007 / Obs 10	0.113	0.293	0.068	0.527	0	0	0	1	0	0	0	0	1	0.000	1.000	2
1008 / Obs 10	0.083	0.189	0.547	0.182	0	0	1	0	0	0	0	0	1	0.011	0.989	2
1009 / Obs 10	0.624	0.204	0.108	0.164	1	0	0	0	0	1	0	0	0	0.043	0.957	2
1010 / Obs 10	0.298	0.301	0.308	0.152	0	0	1	0	1	0	0	0	0	0.044	0.956	2
1011 / Obs 10	0.306	0.456	0.200	0.038	0	1	0	0	0	1	0	0	0	0.000	1.000	2
1012 / Obs 10	0.169	0.446	0.136	0.250	0	1	0	0	1	0	0	0	0	0.339	0.661	2
1013 / Obs 10	0.154	0.090	0.380	0.376	0	0	1	0	0	0	0	0	1	0.002	0.998	2
1014 / Obs 10	0.021	0.779	0.192	0.008	0	1	0	0	0	0	1	0	0	0.507	0.493	1
1015 / Obs 10	0.935	0.052	0.004	0.009	1	0	0	0	1	0	0	0	0	0.888	0.112	1
1016 / Obs 10	0.394	0.318	0.160	0.129	1	0	0	0	1	0	0	0	0	0.001	0.999	2
1017 / Obs 10	0.095	0.234	0.461	0.300	0	0	1	0	0	0	0	0	1	0.606	0.394	1
1018 / Obs 10	0.104	0.320	0.172	0.403	0	0	0	1	0	1	0	0	0	0.001	0.999	2
1019 / Obs 10	0.050	0.653	0.185	0.112	0	1	0	0	0	0	0	1	0	0.001	0.999	2
1020 / Obs 10	0.141	0.619	0.148	0.093	0	1	0	0	0	0	1	0	0	0.039	0.961	2
1021 / Obs 10	0.119	0.057	0.660	0.164	0	0	1	0	0	0	0	0	1	0.007	0.993	2
1022 / Obs 10	0.213	0.000	0.008	0.779	0	0	0	1	0	0	0	0	1	0.897	0.103	1
1023 / Obs 10	0.001	0.139	0.656	0.205	0	0	1	0	0	0	0	0	1	0.539	0.461	1
1024 / Obs 10	0.096	0.378	0.327	0.201	0	1	0	0	0	0	0	0	1	0.049	0.951	2
1025 / Obs 10	0.133	0.431	0.249	0.187	0	1	0	0	0	1	0	0	0	0.001	0.999	2

Latent Class analysis also produces an additional worksheet, Segment Membership, as shown below. The segment membership will show the probability of each respondent belonging to each segment, along with the predicted segment to which the respondent will belong (this is the segment to which a respondent has the highest probability of belonging).

	A	B	C	D	E	F	G	H	I	J	K	L	
1													
2		<b>Sample Segment Assignments</b>											
3		Segment membership probabilities and predicted segment for the sample used to estimate the model.											
4		<b>Respondents / Choice probabilities</b>	<b>Segment 1 probability</b>	<b>Segment 2 probability</b>	<b>Segment 3 probability</b>	<b>Predicted segment</b>							
5		1001	0.449434	0.286537	0.264029	1							
6		1002	0.463221	0.27542	0.26136	1							
7		1003	0.477495	0.263769	0.258736	1							
8		1004	0.443717	0.295419	0.260864	1							
9		1005	0.443433	0.287829	0.268739	1							
10		1006	0.485676	0.254792	0.259533	1							
11		1007	0.440196	0.295463	0.264341	1							
12		1008	0.506788	0.245776	0.247437	1							
13		1009	0.433779	0.311099	0.255123	1							
14		1010	0.419407	0.322026	0.258566	1							
15		1011	0.471711	0.266453	0.261836	1							
16		1012	0.49709	0.248123	0.254787	1							
17		1013	0.509531	0.241164	0.249305	1							
18		1014	0.492029	0.248617	0.259354	1							
19		1015	0.527933	0.227627	0.24444	1							
20		1016	0.477754	0.269379	0.252867	1							
21		1017	0.534808	0.226752	0.238439	1							
22		1018	0.445592	0.29189	0.262518	1							
23		1019	0.530161	0.226284	0.243555	1							
24		1020	0.511429	0.239779	0.248792	1							
25		1021	0.494155	0.256925	0.24892	1							
26		1022	0.485009	0.260995	0.253996	1							
27		1023	0.486545	0.256327	0.257128	1							
28		1024	0.490264	0.251825	0.257911	1							
29		1025	0.507323	0.245191	0.247486	1							

If you requested analysis on a holdout sample, the Segment Membership tab will show the results for the holdout population only, as shown below.

	A	B	C	D	E	F	G	H	I	J	K	L	
1													
2		<b>Sample Segment Assignments</b>											
3		Segment membership probabilities and predicted segment for the hold-out sample.											
4		<b>Respondents / Choice probabilities</b>	<b>Segment 1 probability</b>	<b>Segment 2 probability</b>	<b>Segment 3 probability</b>	<b>Predicted segment</b>							
5		1001	0.001479	0.098425	9.59E-05	2							
6		1002	2.37E-05	0.099963	1.37E-05	2							
7		1003	5.54E-05	0.099724	0.00022	2							
8		1004	0.027876	0.072114	9.43E-06	2							
9		1005	0.048897	0.050652	0.000451	2							
10		1006	0.021553	0.078146	0.0003	2							
11		1007	0.001727	0.098272	1.69E-06	2							
12		1008	6.42E-05	0.099495	0.00044	2							
13		1009	9.47E-05	0.097762	0.002143	2							
14		1010	0.000144	0.097492	0.002364	2							
15		1011	0.033317	0.066677	5.69E-06	2							
16		1012	5.3E-06	0.083795	0.0162	2							
17		1013	0.001331	0.098528	0.000141	2							
18		1014	1.58E-05	0.064687	0.035297	2							
19		1015	7.32E-07	0.031227	0.068773	3							
20		1016	0.000577	0.099327	9.66E-05	2							
21		1017	0.000205	0.060501	0.039294	2							
22		1018	1.66E-05	0.099881	0.000102	2							
23		1019	3.93E-05	0.099926	3.47E-05	2							
24		1020	8.53E-05	0.098199	0.001716	2							
25		1021	2.84E-05	0.099711	0.00026	2							
26		1022	3.19E-06	0.021146	0.078851	3							
27		1023	5.25E-05	0.070382	0.029565	2							
28		1024	3.5E-05	0.097601	0.002365	2							
29		1025	0.002486	0.097451	6.29E-05	2							