

# Calibrating the Mode Choice Models of an Activity-Based Model and a Micro-Simulation Tool

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## Abstract

This is where the abstract should go.

*Keywords:* Accessibility Passive Data Location Choice

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## 1. Question

This repository serves as a template both in how to write a report, and how to do so in RStudio and Bookdown. The parent repository is available as a free template at [https://github.com/byu-transpolab/template\\_bookdown](https://github.com/byu-transpolab/template_bookdown).

The advice in this document comes from numerous sources. Some of it is my own, some has been shared by others. Particular note belongs to:

- Laurie Garrow
- Lisa Rosenstein
- Kara Kockelman

The introduction of your report is not simply an “introduction”, but rather a **motivation** of why your project matters. What is the cost of not solving this problem? What have been previous attempts to solve this problem? The *why* is more important than the *what*. Why is this article worthy of archiving?

A three or four-paragraph structure can work well here.

1. Identify the problem and why it matters.
2. A high-level overview of some previous attempts to solve it, and why those attempts were limited (this might be two paragraphs).
3. Describe the approach (very briefly), and provide an overview of what is to come. “In this paper we present ...”

## 2. Methods

In this chapter, you describe the approach you have taken on the problem. This usually involves a discussion about both the data you used and the models you applied.

### 2.1. Data

Discuss where you got your data, how you cleaned it, any assumptions you made.

Often there will be a table describing summary statistics of your dataset. Table 1 shows a nice table using the `datasummary` functions in the `modelsummary` package.

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Table 1: Descriptive Statistics of Dataset

		regcar (N=10930)		sportuv (N=1048)		sportcar (N=880)		stwagon (N=4446)		truck (N=5628)	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
price		4.2	1.9	4.7	1.9	4.8	2.2	4.1	1.9	4.2	2.0
range		237.2	94.5	241.6	94.7	233.6	96.7	238.7	94.3	238.2	93.1
size		2.4	0.8	2.1	1.0	1.4	1.0	2.3	0.8	2.4	0.8
fuel		N	%	N	%	N	%	N	%	N	%
	gasoline	2704	24.7	280	26.7	218	24.8	1096	24.7	1413	25.1
	methanol	2729	25.0	246	23.5	225	25.6	1091	24.5	1445	25.7
	cng	2767	25.3	260	24.8	238	27.0	1109	24.9	1360	24.2
	electric	2730	25.0	262	25.0	199	22.6	1150	25.9	1410	25.1

## 2.2. Models

If your work is mostly a new model, you probably will have introduced some details in the literature review. But this is where you describe the mathematical construction of your model, the variables it uses, and other things. Some methods are so common (linear regression) that it is unnecessary to explore them in detail. But others will need to be described, often with mathematics. For example, the probability of a multinomial logit model is

$$P_i(X_{in}) = \frac{e^{X_{in}\beta_i}}{\sum_{j \in J} e^{X_{jn}\beta_j}} \quad (1)$$

Use LaTeX mathematics. You'll want to number display equations so that you can refer to them later in the manuscript. Other simpler math can be described inline, like saying that  $i, j \in J$ . Details on using equations in bookdown are available [here](#).

## 3. Findings

This section might be called “Results” instead of “Applications,” depending on what it is that you are working on. But you'll probably say something like “The initial model estimation results are given in Table 2.” That table is created with the `modelsummary()` package and function.

With those results presented, you can go into a discussion of what they mean. first, discuss the actual results that are shown in the table, and then any interesting or unintuitive observations.

### 3.1. Additional Analysis

Usually, it is good to use your model for something.

- Hypothetical policy analysis
- Statistical validation effort
- Equity or impact analysis

If the analysis is substantial, it might become its own top-level section.

Table 2: Model Estimation Results

	Model 1	Model 2
typesportuv	0.833 (5.945) (0.140)	0.815 (5.805) (0.140)
typesportcar	0.614 (4.192) (0.146)	0.628 (4.259) (0.147)
typestwagon	-1.415 (-22.979) (0.062)	-1.428 (-23.119) (0.062)
typetruck	-1.002 (-20.600) (0.049)	-1.010 (-20.673) (0.049)
typevan	-0.812 (-17.431) (0.047)	-0.806 (-17.183) (0.047)
price	-0.221 (-8.475) (0.026)	-0.191 (-7.130) (0.027)
range		0.003 (18.923) (0.000)
Num.Obs.	4654	4654
AIC	15460.9	15075.0
BIC		
Log.Lik.	-7724.469	-7530.510
rho2	-0.052	-0.026
rho20	0.074	0.097