

## Lab 2: Trip Production

9/27/2021

### Trip Production Rates

Many of the original trip production rates provided in the Cube scenario are set at 1 across the board, regardless of purpose, number of vehicles, etc. This is obviously not realistic, so we need to use different data. We used the data from the NHTS 2017 report, which we worked with in HW #2 as well. The data manipulation required to get these values is very similar to that from HW #2, so we present just the results here:

HBW

wrkcount	0 vehicles	1 vehicles	2 vehicles	3 vehicles
0	0.007	0.013	0.058	0.032
1	0.500	0.996	1.224	1.040
2	3.786	2.068	2.299	2.588

HBSHOP

hhszie	0 vehicles	1 vehicles	2 vehicles	3 vehicles
1	0.601	0.874	0.826	0.887
2	2.101	1.748	1.781	1.771
3	1.986	1.678	1.303	1.838
4	1.580	1.820	1.840	1.657

HBO

hhszie	0 vehicles	1 vehicles	2 vehicles	3 vehicles
1	0.414	0.558	0.540	0.339
2	0.420	1.549	1.153	1.123
3	3.980	1.895	2.039	1.931
4	3.318	5.282	4.306	4.195

We also calculated the 95% confidence intervals for each trip type, in case we need to adjust them later:

```
#For HBW
trippod %>%
  group_by(wrkcount, hhvehcnt) %>%
  summarize(
    n = n(),
    HBWsd = wtd.sd(HBW, wthhfin)
  ) %>%
  mutate(
    conf = 1.96 * HBWsd / n^2,
    conf_sci = ifelse(conf < 0.001, scientific(conf, digits = 3), round(conf, digits = 3)),
    hhvehcnt = paste(hhvehcnt, "vehicles")
  ) %>%
  pivot_wider(id_cols = wrkcount, names_from = hhvehcnt, values_from = conf_sci) %>%
  my_flextable() %>%
  add_header_lines("HBW Confidence Intervals")
```

HBW Confidence Intervals

wrkcount	0 vehicles	1 vehicles	2 vehicles	3 vehicles
0	1.54e-06	9.64e-08	4.49e-07	1.82e-06
1	2.55e-04	9.28e-07	1.19e-06	3.19e-06
2	0.062	1.35e-04	1.62e-06	1.92e-06

(Note the code is virtually same for the other purposes)

HBSHOP Confidence Intervals

hhszie	0 vehicles	1 vehicles	2 vehicles	3 vehicles
1	1.75e-05	4.11e-07	7.32e-06	5.72e-05
2	0.001	6.78e-06	6.19e-07	2.17e-06
3	0.006	1.58e-04	1.84e-05	1.19e-05
4	0.039	3.55e-04	1.69e-05	1.32e-05

HBO Confidence Intervals

hhszie	0 vehicles	1 vehicles	2 vehicles	3 vehicles
1	1.44e-05	3.71e-07	6.30e-06	3.32e-05
2	5.99e-04	5.65e-06	5.22e-07	1.85e-06
3	0.007	1.59e-04	2.51e-05	1.25e-05
4	0.036	7.40e-04	3.04e-05	2.13e-05

We then wrote these tables to their respective .dbf files and ran the Trip Generation submodel in Cube. Ideally, the total output trips would be somewhat close to the NHTS reported total weighted trips for the area. After our first run, these are the results we got: