

## PROBLEM SET 5

### MGMT 737

1. **Poisson Regression.** This analysis will use the dataset `Detroit.csv`. You should use built-in packages for this – in R, use the `fixest` library. In Stata, use the `reghdfe` and `ppmlhdfc` packages.
  - (a) Run an OLS regression of `flows` (the number of workers who work in `home_ID` and work in `work_ID`) on `distance_Google_miles`, and include `home_ID` and `work_ID` fixed effects (absorb them), and cluster on `home_ID`. Report the coefficient and standard error on `distance_Google_miles`.
  - (b) Run an OLS regression of `log(flows)` on `log(distance_Google_miles)` and include `home_ID` and `work_ID` fixed effects, omitting the cells with zero flows. Cluster on `home_ID`. Report the coefficient and standard error on `log(distance_Google_miles)`.
  - (c) Repeat part 1b, but instead of omitting the zero cells, run the OLS regression of `log(c + flows)` for  $c = 0.1, 1$  and  $10$ . Compare how your coefficients change.
  - (d) Finally, repeat part 1a using Poisson regression, and contrast the estimates to Part b and c.
2. **Duration Modeling.** This analysis will use the dataset `acs_duration.csv`. The `acs_duration.csv` dataset is from the American Community Survey in 2019, and has heads of households' responses to the question "How long have you lived in this home?" (`moving_approx` – in reality, this value is given as a range in the public data – I have imputed using the midpoint. A fun exercise left to the reader is to think about how to generalize this problem using ranges.) and homeownership (`homeowner` vs. `renter`).
  - (a) Using the ACS data, write down how to estimate the unconditional probability that a household stays in a home for  $T$  or more years, using the available data. Estimate this for  $T = 7$  and report the value.
  - (b) Calculate the hazard rate for each observed value of `moving_approx`. Report this value for  $T = 7$ .
  - (c) Recalculate these hazard values for  $T = 7$  for homeowners and renters. Contrast the difference in hazard rates over time.