

Help for Case Study: Bus Insurance

1. Offset variables are discussed in Sect. 3.6.3. Note that our offset in this case is $\log(u_j)$.
2. Our goal in Step 3 of The Backfitting Algorithm 4.2.2 is to compute \hat{U}_j . With $\mu_i = \mu\gamma_i$, rewrite

$$\tilde{z}_j = \frac{\sum_{i,t} w_{ijt}\mu_i}{\mu\sigma^2/\tau^2 + \sum_{i,t} w_{ijt}\mu_i}. \quad (0.1)$$

The point in this is that the μ_i are easily computed from the *predicted values* that can be retrieved from Proc Genmod by adding the statement

```
ods output ObStats=PredVarden;
```

Now μ_i (mu) can be added to your data as follows

```
data busfile;
  merge busfile PredVarden(keep=pred);
  mu=pred/exp(cake);
  drop pred cake;
run;
```

3. There are quite a lot of estimated u_j 's. Here is some SAS code that produces a histogram of these u 's.

```
proc univariate data=ufile noprint;
  var u;
  histogram;
  inset min p10 median p90 max/header='Quantiles' pos=ne;
  title "whatever";
run;
```