

```
library(psc1)

model1 = zeroinfl(Infections ~ Swimmer + Location + Age + Sex | Swimmer +
                  Location + Age + Sex, dist = "negbin", data = earinfection)

summary(model1)

summary(model2 <- glm(Infections ~ Swimmer + Location + Age + Sex,
                      family = poisson, data = earinfection))

vuong(model2, model1)
```

```
Call:
zeroinfl(formula = Infections ~ Swimmer + Location + Age + Sex | Swimmer +
          Location + Age + Sex, data = earinfection, dist = "negbin")

Pearson residuals:
      Min       1Q   Median       3Q      Max
-0.7741 -0.6467 -0.4308  0.3747  6.1088

Count model coefficients (negbin with log link):
              Estimate Std. Error z value Pr(>|z|)
(Intercept)  2.10576    0.65143   3.232 0.001227 **
Swimmer      -0.67532    0.19616  -3.443 0.000576 ***
Location     -0.06729    0.23856  -0.282 0.777895
Age          -0.01700    0.02285  -0.744 0.456951
Sex          -0.15246    0.22102  -0.690 0.490321
Log(theta)   -0.25032    0.21213  -1.180 0.237979

Zero-inflation model coefficients (binomial with logit link):
              Estimate Std. Error z value Pr(>|z|)
(Intercept) -24.0614    317.6901  -0.076  0.940
Swimmer      -0.4899     0.7880  -0.622  0.534
Location     11.8002    158.8409   0.074  0.941
Age           0.1043     0.0859   1.214  0.225
Sex          -1.4259     1.3285  -1.073  0.283
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Theta = 0.7786
Number of iterations in BFGS optimization: 47
Log-likelihood: -440.9 on 11 Df
```

```
Call:
glm(formula = Infections ~ Swimmer + Location + Age + Sex, family = poisson,
    data = earinfection)

Deviance Residuals:
      Min       1Q   Median       3Q      Max
-2.2645 -1.5740 -1.1165  0.5223  6.5151

Coefficients:
              Estimate Std. Error z value Pr(>|z|)
(Intercept)  2.39806    0.32369   7.409 1.28e-13 ***
Swimmer      -0.60863    0.10502  -5.795 6.82e-09 ***
Location     -0.48960    0.10483  -4.670 3.01e-06 ***
Age          -0.02606    0.01222  -2.132  0.033 *
Sex           0.02938    0.10916   0.269  0.788
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for poisson family taken to be 1)

      Null deviance: 824.51  on 286  degrees of freedom
Residual deviance: 760.01  on 282  degrees of freedom
AIC: 1142.4

Number of Fisher Scoring iterations: 6
```

```
> vuong(model2, model1)
```

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Vuong Non-Nested Hypothesis Test-Statistic:  
(test-statistic is asymptotically distributed N(0,1) under the  
null that the models are indistinguishable)
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                Vuong z-statistic          H_A      p-value  
Raw                -4.287262 model2 > model1 9.0444e-06  
AIC-corrected      -4.116180 model2 > model1 1.9260e-05  
BIC-corrected      -3.803143 model2 > model1 7.1436e-05
```