Problem Set 1

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1 Problem 1. OLS in MATA

1.1 Part 1

```
. myreg1 lnwage hieduc exp exp2
b[4,1]
            c1
r1   .08264541
r2   .02523881
r3  -.00037668
r4   1.3094414
symmetric V[4,4]
            c1          c2          c3          c4
r1   1.195e-06
r2   1.595e-07   .00001683
r3  -4.035e-09  -3.770e-07   8.579e-09
r4  -.00001749  -.00017676   3.899e-06   .00211062
. quiet reg lnwage hieduc exp exp2
. matrix list e(b)
e(b)[1,4]
        hieduc         exp        exp2       _cons
y1   .08264541   .02523881  -.00037668   1.3094414
. matrix list e(V)
symmetric e(V)[4,4]
            hieduc         exp        exp2       _cons
hieduc   1.195e-06
   exp   1.595e-07   .00001683
  exp2  -4.035e-09  -3.770e-07   8.580e-09
 _cons   -.0000175  -.00017676   3.899e-06   .00211066
```

/subsectionPart 2

```
.
. myreg2 lnwage hieduc exp exp2
b[4,1]
            c1
r1   .08264541
r2   .02523881
```

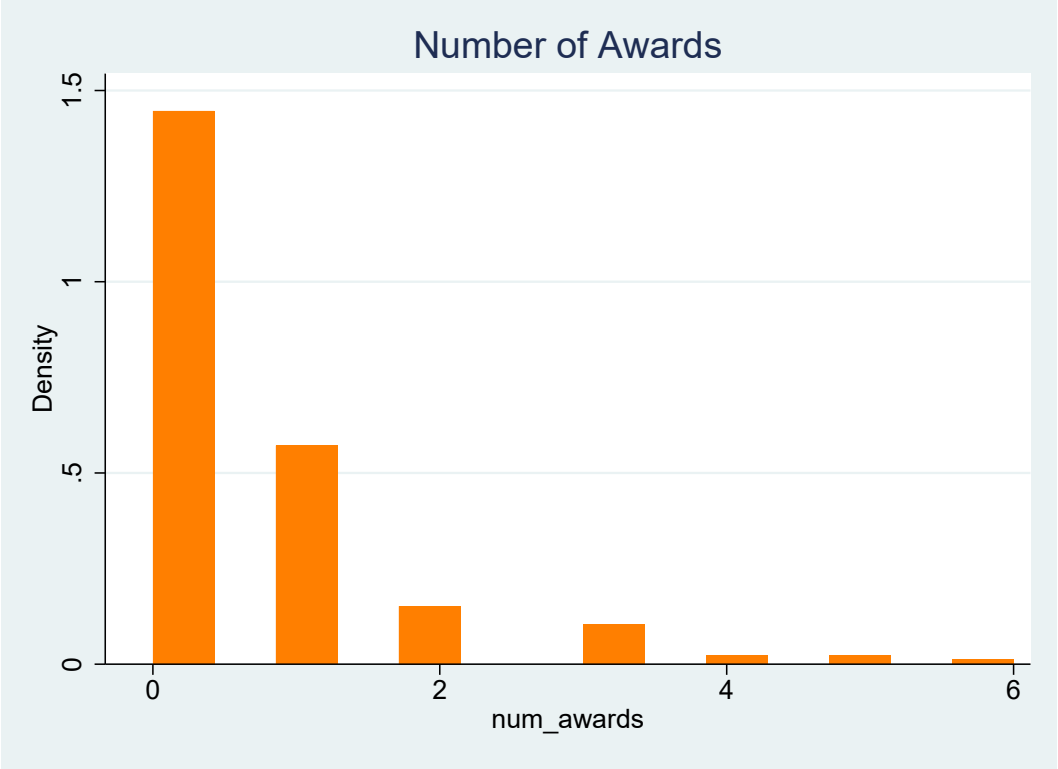
```
r3  -.00037668
r4   1.3094414
symmetric V[4,4]
            c1          c2          c3          c4
r1   1.520e-06
r2   1.712e-07   .00001632
r3  -4.045e-09  -3.685e-07   8.451e-09
r4  -.00002216  -.00016979   3.771e-06   .00208194
. quiet reg lnwage hieduc exp exp2, robust
. matrix list e(b)
e(b)[1,4]
        hieduc         exp        exp2       _cons
y1   .08264541   .02523881  -.00037668   1.3094414
. matrix list e(V)
symmetric e(V)[4,4]
            hieduc         exp        exp2       _cons
hieduc   1.520e-06
   exp   1.712e-07   .00001632
  exp2  -4.045e-09  -3.685e-07   8.451e-09
 _cons  -.00002216  -.00016979   3.771e-06   .00208194
.
```

/sectionProblem 2. Poisson using Maximum Likelihood

If y_i is distributed Poission with mean $exp(X_i^{'}/beta)$, hence the likelihood function for a sample of N observations is given by:

And taking logs we get:

```
. hist(num_awards), title("Number of Awards") color("orange")
(bin=14, start=0, width=.42857143)
```


Number of Awards
Density
0
.5
1
1.5
0
2
4
6
num_awards