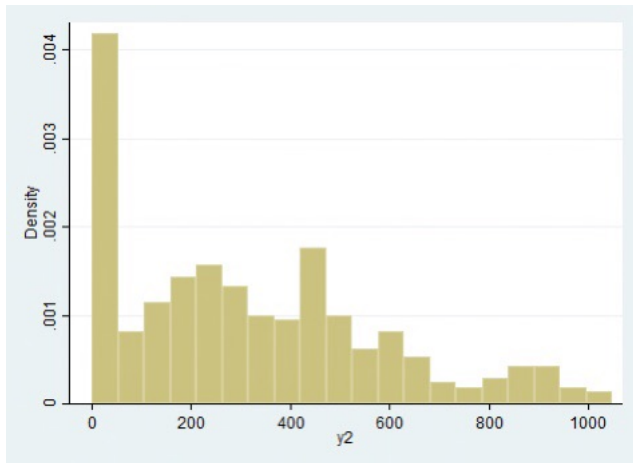


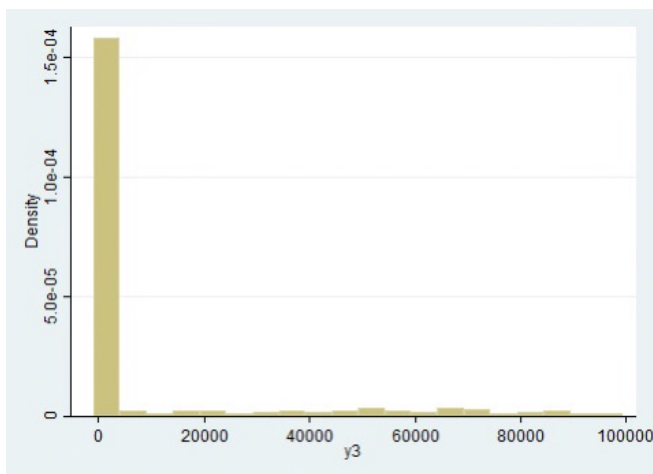
Limitation : Truncated sample
only y

→ Use Truncated regression model



Limitation : Censored sample

→ Use Tobit model



Limitation : censored sample
outlier.

→ Use Tobit model.

```

18 . histogram y1
    (bin=17, start=103.46626, width=55.638129)

19 . graph export "C:\Users\Kriss\OneDrive\เดสก์ท็อป\426\y1.png", as(png) replace
    (note: file C:\Users\Kriss\OneDrive\เดสก์ท็อป\426\y1.png not found)
    (file C:\Users\Kriss\OneDrive\เดสก์ท็อป\426\y1.png written in PNG format)

20 . histogram y2
    (bin=20, start=0, width=52.465723)

21 . graph export "C:\Users\Kriss\OneDrive\เดสก์ท็อป\426\y2.png", as(png) replace
    (note: file C:\Users\Kriss\OneDrive\เดสก์ท็อป\426\y2.png not found)
    (file C:\Users\Kriss\OneDrive\เดสก์ท็อป\426\y2.png written in PNG format)

22 . histogram y3
    (bin=20, start=-866.33484, width=5018.7203)

23 . graph export "C:\Users\Kriss\OneDrive\เดสก์ท็อป\426\y3.png", as(png) replace
    (note: file C:\Users\Kriss\OneDrive\เดสก์ท็อป\426\y3.png not found)
    (file C:\Users\Kriss\OneDrive\เดสก์ท็อป\426\y3.png written in PNG format)

24 . sum y1 y2 y3
    
```

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|----------|-----|----------|-----------|-----------------|-----------------|
| y1 | 297 | 423.1683 | 227.8976 | <u>103.4663</u> | 1049.314 |
| y2 | 400 | 317.5914 | 266.3419 | 0 | 1049.314 |
| y3 | 400 | 10446.1 | 23186.57 | -866.3348 | <u>99508.07</u> |

```
25 . *2
```

```
26 . reg y1 x
```

4,

| Source | SS | df | MS | Number of obs | = | 297 |
|----------|------------|-----|------------|---------------|---|--------|
| Model | 1431905.59 | 1 | 1431905.59 | F(1, 295) | = | 30.30 |
| Residual | 13941534.7 | 295 | 47259.4396 | Prob > F | = | 0.0000 |
| Total | 15373440.3 | 296 | 51937.2982 | R-squared | = | 0.0931 |
| | | | | Adj R-squared | = | 0.0901 |
| | | | | Root MSE | = | 217.39 |

| y1 | Coef. | Std. Err. | t | P> t | [95% Conf. Interval] |
|-------|----------|-----------|------|-------|----------------------|
| x | 123.1693 | 22.37637 | 5.50 | 0.000 | 79.13176 167.2069 |
| _cons | 69.01677 | 65.56422 | 1.05 | 0.293 | -60.01611 198.0496 |

```
27 . predict y1_hat
    (option xb assumed; fitted values)
```

```
28 . est store m_y1
```

```
29 . truncreg y1 x, ll(100) nolog
    (note: 0 obs. truncated)
```

```

Truncated regression
Limit:   lower =      100           Number of obs   =      297
         upper =     +inf           Wald chi2(1)     =      23.70
Log likelihood = -1975.456         Prob > chi2      =      0.0000
    
```

| y1 | Coef. | Std. Err. | z | P> z | [95% Conf. Interval] |
|--------|-----------|-----------|-------|-------|----------------------|
| x | 243.9104 | 50.10515 | 4.87 | 0.000 | 145.7061 342.1147 |
| _cons | -431.5919 | 172.0405 | -2.51 | 0.012 | -768.7851 -94.39859 |
| /sigma | 302.9879 | 25.65687 | 11.81 | 0.000 | 252.7013 353.2744 |

```
30 . predict truncated, e(0,.)
31 . est store m_yltrunc
32 . lrtest m_y1 m_yltrunc, force
```

H₀ is rejected, truncated model is appropriate.

Likelihood-ratio test
(Assumption: m_y1 nested in m_yltrunc)

LR chi2(1) = 86.66
Prob > chi2 = 0.0000 < 0.05

```
33 . reg y2 x
```

| Source | SS | df | MS | Number of obs | = | 400 |
|----------|------------|-----|------------|---------------|---|--------|
| Model | 4567087.34 | 1 | 4567087.34 | F(1, 398) | = | 76.58 |
| Residual | 23737174.2 | 398 | 59641.1413 | Prob > F | = | 0.0000 |
| Total | 28304261.6 | 399 | 70937.9989 | R-squared | = | 0.1614 |
| | | | | Adj R-squared | = | 0.1592 |
| | | | | Root MSE | = | 244.22 |

| y2 | Coef. | Std. Err. | t | P> t | [95% Conf. Interval] |
|-------|-----------|-----------|-------|-------|----------------------|
| x | 179.8325 | 20.55046 | 8.75 | 0.000 | 139.4315 220.2335 |
| _cons | -179.3679 | 58.08821 | -3.09 | 0.002 | -293.566 -65.1698 |

```
34 . predict y2_hat
(option xb assumed; fitted values)
```

```
35 . est store m_y2
```

```
36 . tobit y2 x, ll(0)
```

Tobit regression

Number of obs = 400
LR chi2(1) = 73.17
Prob > chi2 = 0.0000
Pseudo R2 = 0.0151

Log likelihood = -2389.3077

| y2 | Coef. | Std. Err. | t | P> t | [95% Conf. Interval] |
|--------|-----------|-----------|-------|-------|----------------------|
| x | 219.1562 | 24.86468 | 8.81 | 0.000 | 170.2741 268.0383 |
| _cons | -318.6265 | 70.93087 | -4.49 | 0.000 | -458.0714 -179.1816 |
| /sigma | 284.9073 | 11.56717 | | | 262.1671 307.6475 |

72 left-censored observations at y2 <= 0
328 uncensored observations
0 right-censored observations

```
37 . predict censored, ystar(0,.)
```

```
38 . est store m_y2censor
```

```
39 . lrtest m_y2hat m_y2censor, force
estimation result m_y2hat not found
r(111);
```

```
40 . lrtest m_y2 m_y2censor, force
```

Likelihood-ratio test
(Assumption: m_y2 nested in m_y2censor)

LR chi2(1) = 752.97
Prob > chi2 = 0.0000 < 0.05

H₀ is rejected, Tobit model is appropriate.

42

