

## **2. Tests for Normality of Residuals**

# Tests for Normality of Residuals

We use the `predict` command with the `resid` option to generate `residuals` and we name the residuals `r`.

```
. predict r, resid
```

# Tests for Normality of Residuals

## Shapiro-Wilk $W$ test for Normality

For verifying that the residuals are normally distributed, which is a very important assumption for regression, we use Shapiro-Wilk  $W$  test for normal data

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```
. swilk r
```

# Tests for Normality of Residuals

## Shapiro-Wilk W test for Normality

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```
. swilk r
```

```
Shapiro-Wilk W test for normal data
Variable | Obs      W      V      z      Prob>z
-----+-----
          r | 200    0.98714  1.919  1.499  0.06692
```

# Tests for Normality of Residuals

In verifying that the residuals are **normally distributed**, which is a very important **assumption** for regression,

the **kdensity** command with the normal option displays a

**density graph of the residuals**

with an

**normal distribution superimposed**

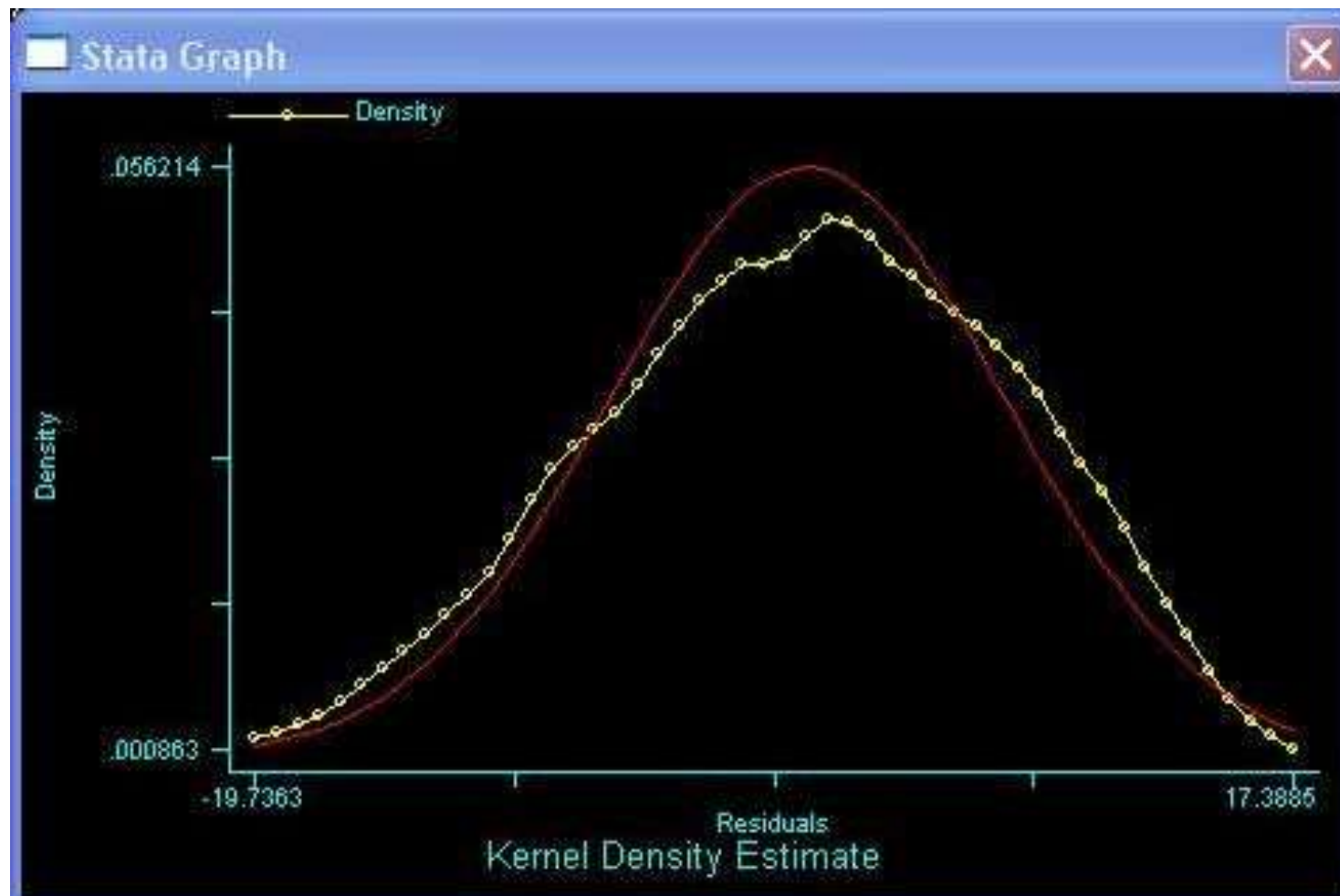
on the graph.

# Tests for Normality of Residuals

. kdensity r, normal

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```
. kdensity r, normal
```





# Tests for Normality of Residuals

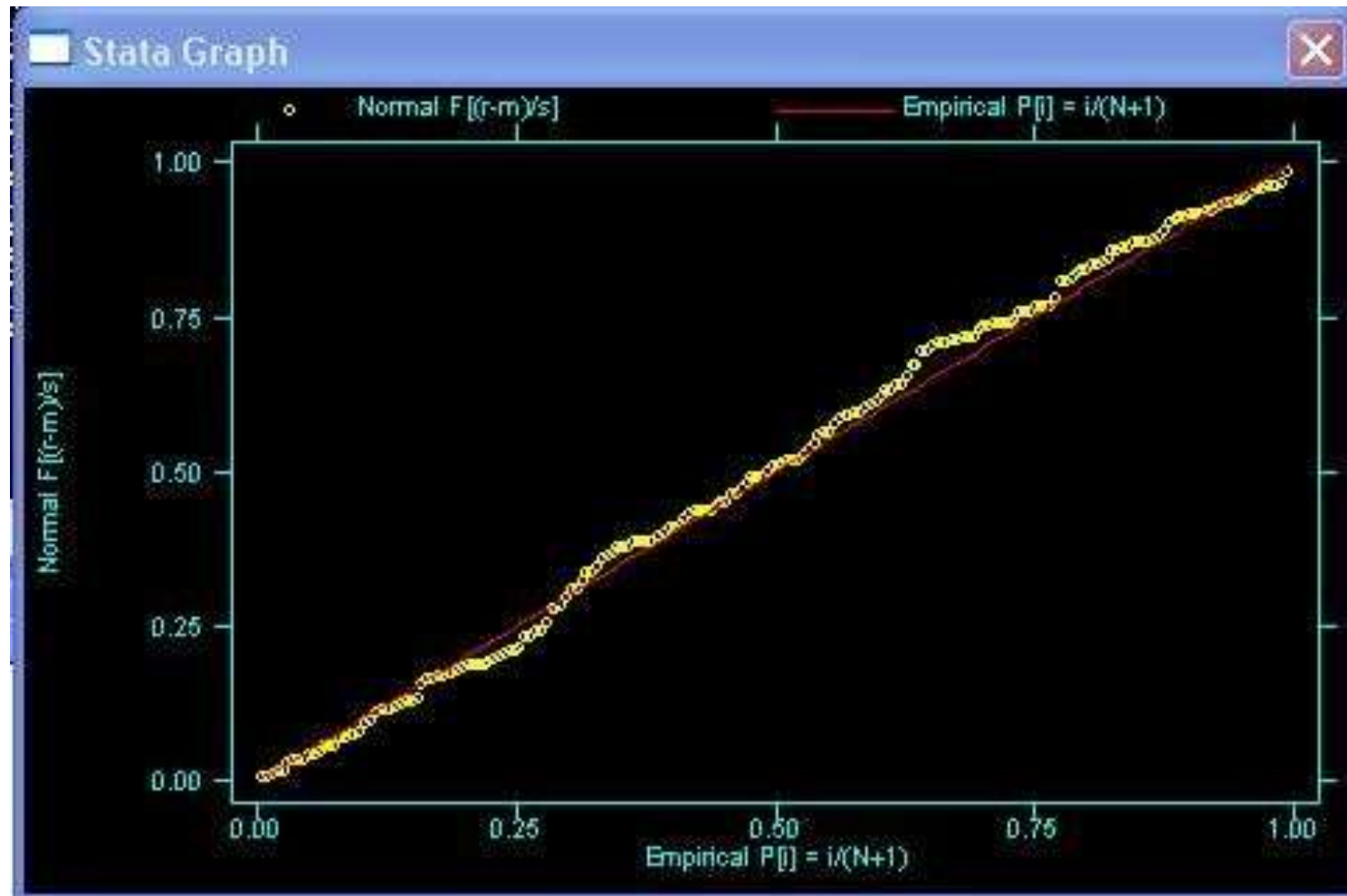
The `pnorm` command produces a **normal probability plot** and it is another method of testing whether the **residuals** from the regression are **normally distributed**.

# Tests for Normality of Residuals

. pnorm r

# Tests for Normality of Residuals

. pnorm r



# Tests for Normality of Residuals

The `qnorm` command produces a **normal quantile plot**.

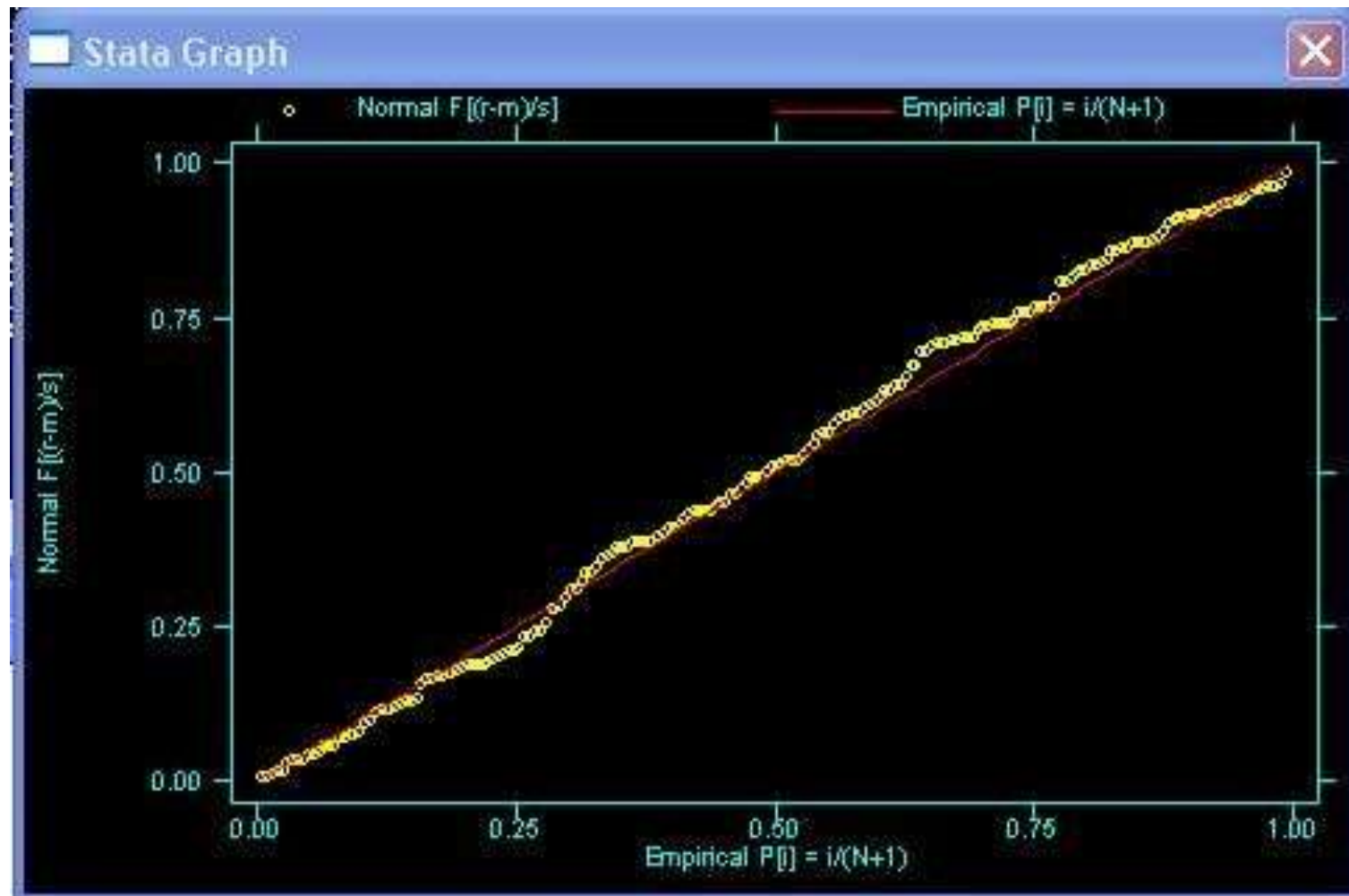
It is yet another method for testing if the **residuals are normally distributed**.

# Tests for Normality of Residuals

. qnorm r

# Tests for Normality of Residuals

. qnorm r



# Tests for Normality of Residuals

## Summary of Tests for Normality of Residuals

- swilk** performs the Shapiro-Wilk  $W$  test for normality.
- kdensity** produces kernel density plot with normal distribution overlaid.
- pnorm** graphs a standardized normal probability (P-P) plot.
- qnorm** plots the quantiles of varname against the quantiles of a normal distribution.