Precept 1: Standardization and Decomposition

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1 Equations

1.1 Crude Death Rates

$$
\begin{aligned}
CDR &= \frac{D}{N} \\
&= \frac{\sum_{x=0}^{\infty} {}_nD_x}{N} \\
&= \frac{\sum_{x=0}^{\infty} \frac{{}_nD_x}{{}_nN_x} {}_nN_x}{N} \\
&= \sum_{x=0}^{\infty} \frac{{}_nD_x}{{}_nN_x} \cdot \frac{{}_nN_x}{N} \\
&= \sum_{x=0}^{\infty} {}_nM_x \cdot {}_nC_x
\end{aligned}
$$

$$
CDR = \sum_{i=1}^{\infty} M_i \cdot C_i
$$

1.2 Standardized Rates

$$
CDR^* = \sum_{i=1}^{\infty} M_i^A \cdot C_i^B
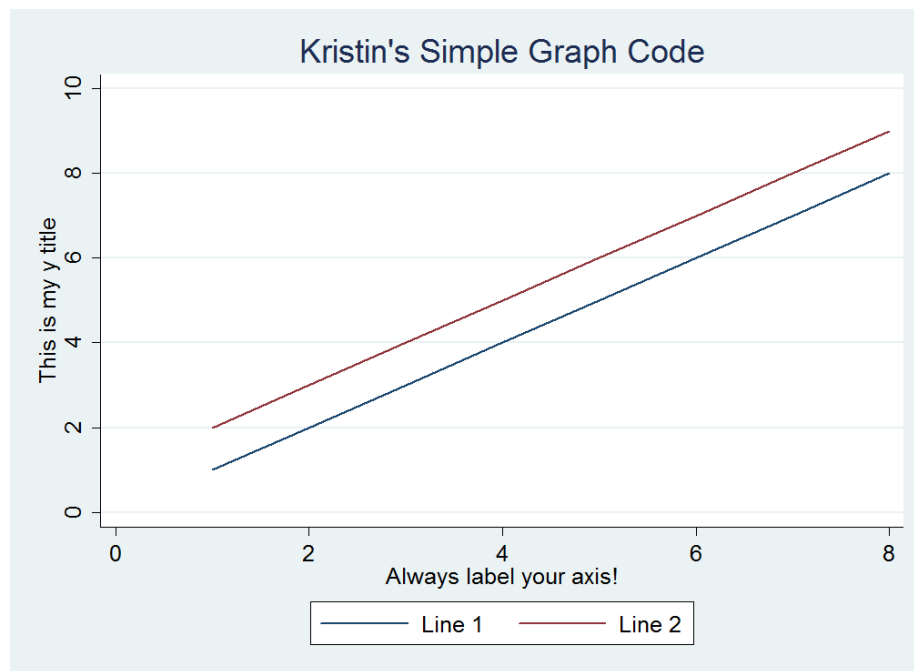$$

1.3 Difference Between Rates

$$\Delta = CDR^B - CDR^A$$

$$= \sum_i M_i^B \cdot C_i^B - \sum_i M_i^A \cdot C_i^A$$

By expanding and rearranging (see Preston Page 28):

$$\Delta = \sum_i \left(C_i^B - C_i^A \right) \cdot \left[\frac{M_i^B - M_i^A}{2} \right] + \sum_i \left(M_i^B - M_i^A \right) \cdot \left[\frac{C_i^B - C_i^A}{2} \right]$$

2 Stata

2.1 Graphs


```
#delimit ;
twoway (line y1 x) (line y2 x), \\
title("Kristin's Simple Graph Code") \\
legend(order(1 "Line 1" 2 "Line 2")) \\
ytitle("This is my y title") \\
xtitle("Always label your axis!") \\
;
```

2

2.2 _n

_n is a variable containing the case number of each observation.

For example:

gen var5 = var3[_n]

Is equivalent to:

gen var5 = var3

Because it simply sets each element of var5 equal to the corresponding element of var3.

You can also use _n to refer to items above or below a line. For example, say you had data for a number of days, and you want to lag the data by a day.

gen lagvar3 = var3[_n−1]

This refers to one line above in the data, while

gen lagvar3 = var3[_n+1]

Refers to one line below in the data.

2.3 aweight

Analytic aweights are typically appropriate when you are dealing with data containing averages. For instance, you have average income and average characteristics on a group of people. The weighting variable contains the number of persons over which the average was calculated (or a number proportional to that amount).

The general syntax is:

command ... [aw=exp] ...

2.4   Helpful math commands

~	not
|	or
&	and
==	equals
+	plus
-	minus
*	multiplied by
/	divided by
^	raised to
>	greater than
>=	greater than or equal to
<	less than
<=	less than or equal to

2.5   Additional Stata commands

gen
egen
bysort
list
tabstat
mean
total
count
drop
ln
di
graph twoway