

-----  
log: C:\stat\stataDATA\phm.log  
log type: text  
opened on: 11 Mar 2005, 05:01:33

#####  
## K-M Est and Weibull Model  
#####  
. stset t, failure(cc)

failure event: cc != 0 & cc < .  
obs. time interval: (0, t]  
exit on or before: failure

-----  
40 total obs.  
0 exclusions

-----  
40 obs. remaining, representing  
16 failures in single record/single failure data  
107 total analysis time at risk, at risk from t = 0  
earliest observed entry t = 0  
last observed exit t = 7.9

. sts list if age>=45

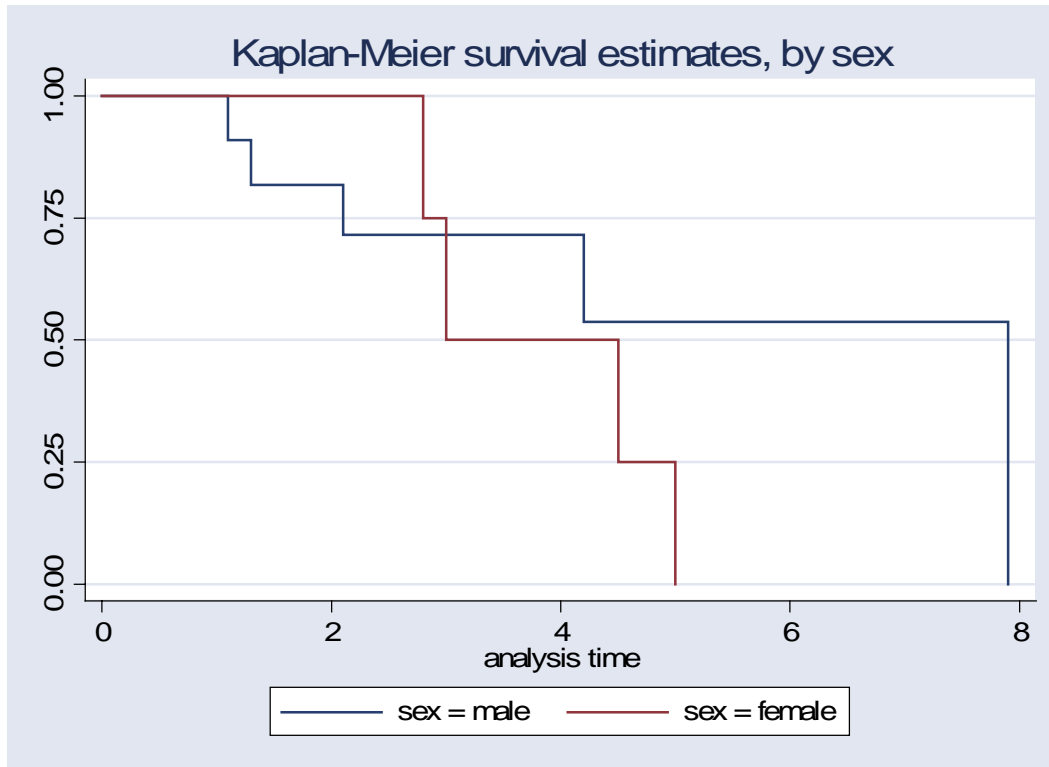
failure \_d: cc  
analysis time \_t: t

Time	Beg. Total	Fail	Net Lost	Survivor Function	Std. Error	[95% Conf. Int.]	
.1	19	0	2	1.0000	.	.	.
.5	17	0	1	1.0000	.	.	.
.6	16	0	1	1.0000	.	.	.
.7	15	1	0	0.9333	0.0644	0.6126	0.9903
.9	14	1	1	0.8667	0.0878	0.5639	0.9649
1.1	12	0	1	0.8667	0.0878	0.5639	0.9649
1.2	11	0	1	0.8667	0.0878	0.5639	0.9649
1.6	10	0	1	0.8667	0.0878	0.5639	0.9649
2.1	9	0	1	0.8667	0.0878	0.5639	0.9649
2.3	8	1	0	0.7583	0.1272	0.4035	0.9191
2.7	7	1	0	0.6500	0.1481	0.2968	0.8583
3.4	6	1	1	0.5417	0.1582	0.2103	0.7858
3.6	4	1	0	0.4063	0.1668	0.1107	0.6917
5	3	1	1	0.2708	0.1568	0.0444	0.5781
7.2	1	0	1	0.2708	0.1568	0.0444	0.5781

-----

```
## Graph
```

```
. sts graph if age<45, by(sex)
```



```
. - label define gender 1 "female"- label define gender 0 "male", add
```

```
. label values sex gender
```

```
. sts graph if age<45, by(sex)
```

```
failure _d: cc
```

```
analysis time _t: t
```

```
## Weibull model: Additive model
```

```
. streg sex age, dist(weibull) nohr
```

```
failure _d: cc
```



```
Iteration 2: log likelihood = -28.051129
Iteration 3: log likelihood = -28.051073
Iteration 4: log likelihood = -28.051073
```

Fitting full model:

```
Iteration 0: log likelihood = -28.051073
Iteration 1: log likelihood = -26.266535
Iteration 2: log likelihood = -26.069226
Iteration 3: log likelihood = -26.069039
Iteration 4: log likelihood = -26.069039
```

Weibull regression -- log relative-hazard form

```
No. of subjects = 40          Number of obs = 40
No. of failures = 16
Time at risk = 106.9999999
Log likelihood = -26.069039
LR chi2(3) = 3.96
Prob > chi2 = 0.2654
```

_t	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
_Isex_1	3.930096	3.346646	1.17	0.240	-2.62921	10.4894
age	.0539754	.0497589	1.08	0.278	-.0435502	.1515009
_IsexXage_1	-.069554	.0745355	-0.93	0.351	-.2156409	.0765329
_cons	-5.894339	2.417798	-2.44	0.015	-10.63314	-1.155541
/ln_p	.6306037	.1928416	3.27	0.001	.252641	1.008566
p	1.878744	.3623002			1.287421	2.741668
1/p	.5322704	.1026439			.3647415	.7767467

```
#####
##      Cox PHM
#####
```

```
. stcox sex age, nohr
```

```
failure _d: cc == 1
analysis time _t: t
```

```
Iteration 0: log likelihood = -41.443288
Iteration 1: log likelihood = -40.501233
Iteration 2: log likelihood = -40.500447
Refining estimates:
Iteration 0: log likelihood = -40.500447
```

Cox regression -- Breslow method for ties

```
No. of subjects = 40          Number of obs = 40
No. of failures = 16
Time at risk = 106.9999999
Log likelihood = -40.500447
LR chi2(2) = 1.89
Prob > chi2 = 0.3895
```

_t	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
sex	.5748357	.5241072	1.10	0.273	-.4523956	1.602067
age	.0295216	.040294	0.73	0.464	-.0494531	.1084964

```
. sts test sex, cox
```

```
failure _d: cc == 1
analysis time _t: t
```

Cox regression-based test for equality of survival curves

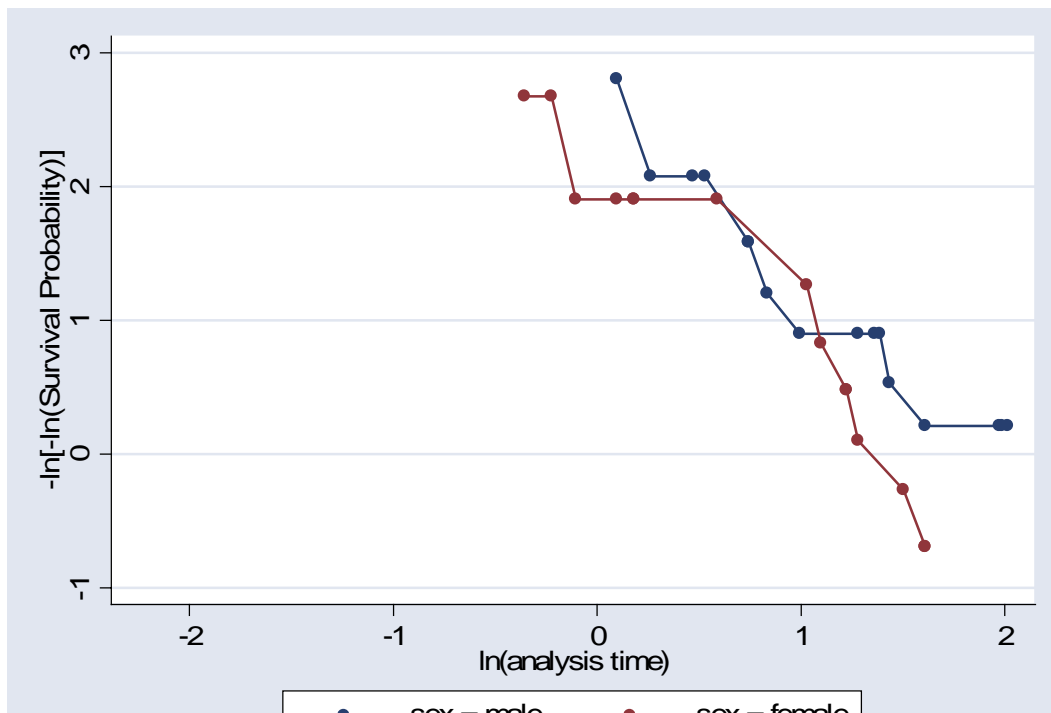
sex	Events observed	Events expected	Relative hazard
male	8	10.21	0.8028
female	8	5.79	1.4731
Total	16	16.00	1.0000

```
LR chi2(1) = 1.35
Pr>chi2 = 0.2449
```

```
#####
## Model Checking
#####
```

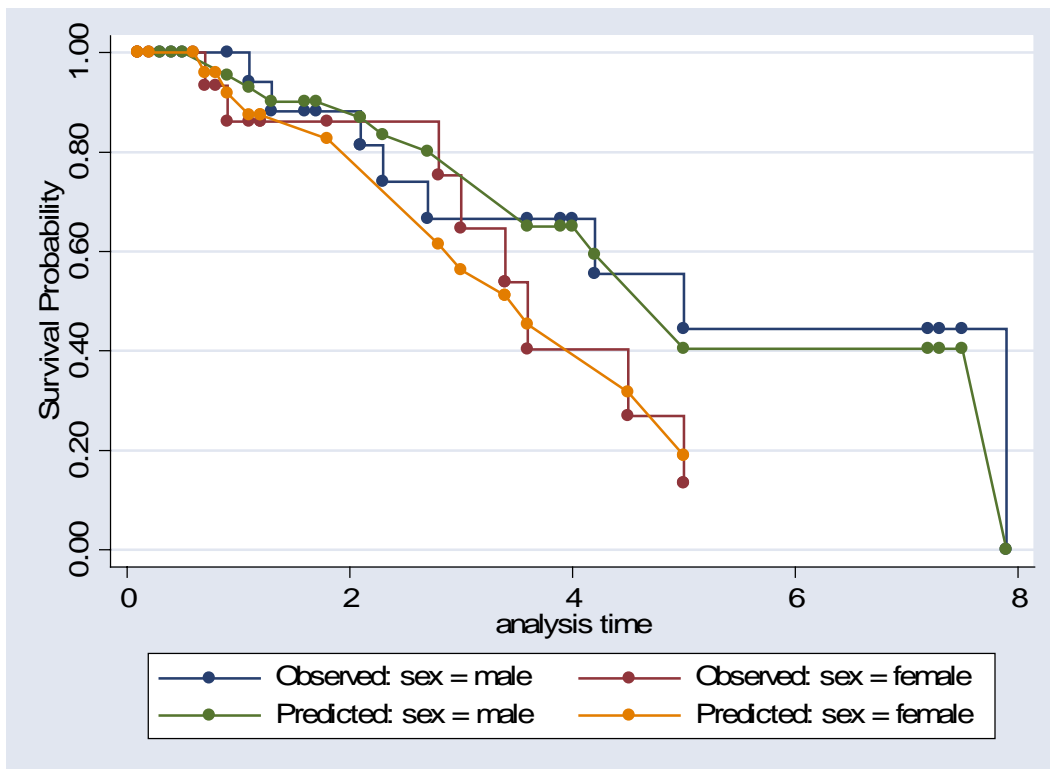
stphplot plots  $-\ln(-\ln(\text{survival}))$  curves for each category of a nominal or ordinal independent variable versus  $\ln(\text{time})$ . These are often referred to as "log-log" plots. Optionally, these estimates can be adjusted for covariates. The proportional hazards assumption is not violated when the curves are parallel.

```
. stphplot, by(sex)
```



stcoxkm plots Kaplan-Meier observed survival curves and compares them to the Cox predicted curves for the same variable. (Do not run stcox prior to this command; stcoxkm will execute stcox itself to fit the model and obtain predicted values.) The closer the observed values are to the predicted, the less likely the proportional hazards assumption has been violated.

```
. stcoxkm, by(sex)
```



## Run a more complicated cox PHM, save many variable for later model checking and graph

```
. stcox sex age, mgale(parM) esr(esr*) schoenfeld(sch*) scaledsch(sca*)
basechazard(cHa) basesurv(baSur)
```

```
failure _d: cc == 1
analysis time _t: t
```

Refining estimates:  
Iteration 0: log likelihood = -40.500447

Cox regression -- Breslow method for ties

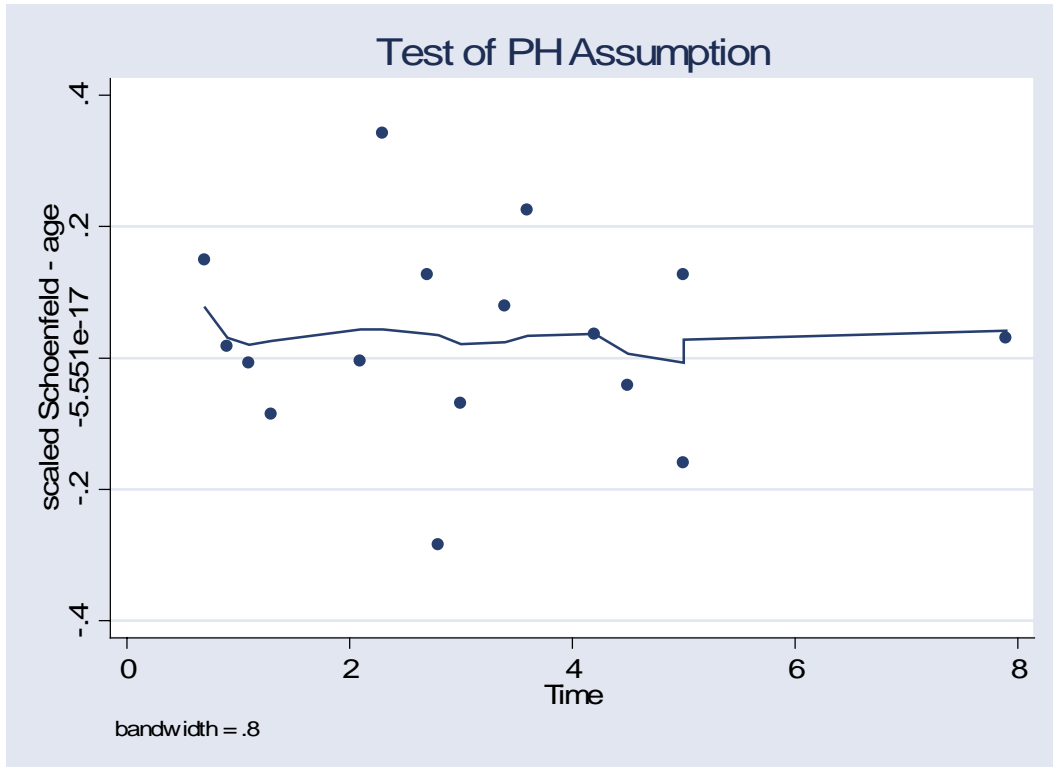
No. of subjects =	40	Number of obs =	40
No. of failures =	16		
Time at risk =	106.9999999		
Log likelihood =	-40.500447	LR chi2(2) =	1.89
		Prob > chi2 =	0.3895

---

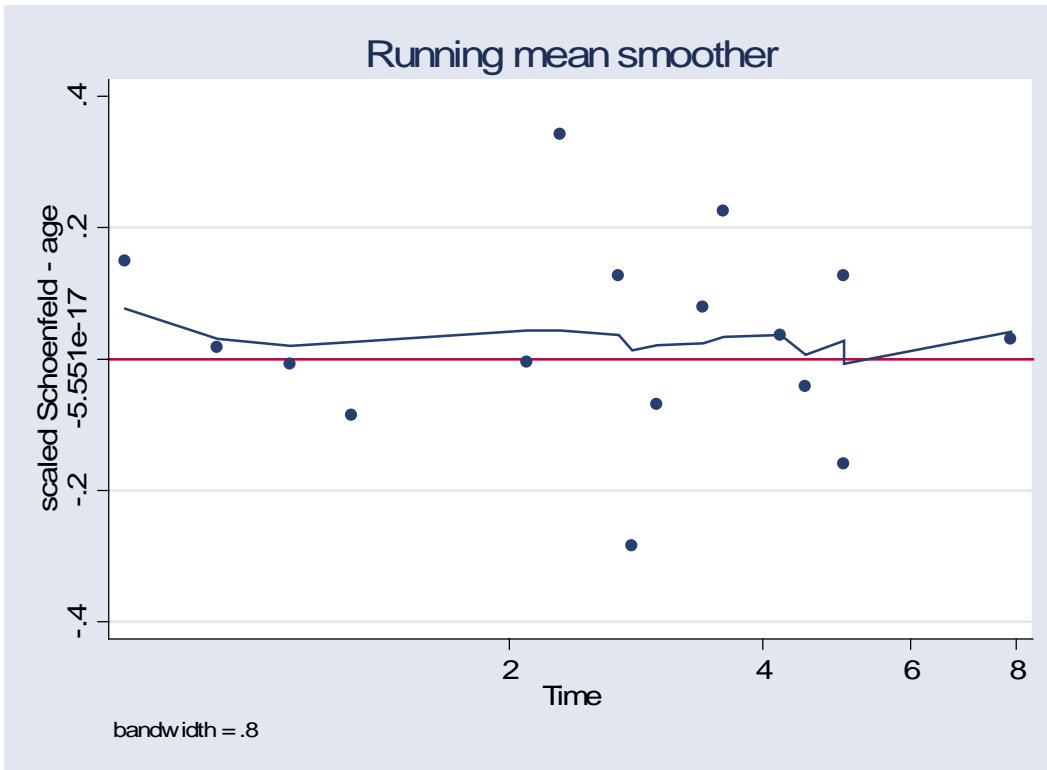
_t	Haz. Ratio	Std. Err.	z	P> z	[95% Conf. Interval]
sex	1.776839	.9312539	1.10	0.273	.6361025 4.963281
age	1.029962	.0415013	0.73	0.464	.9517498 1.114601

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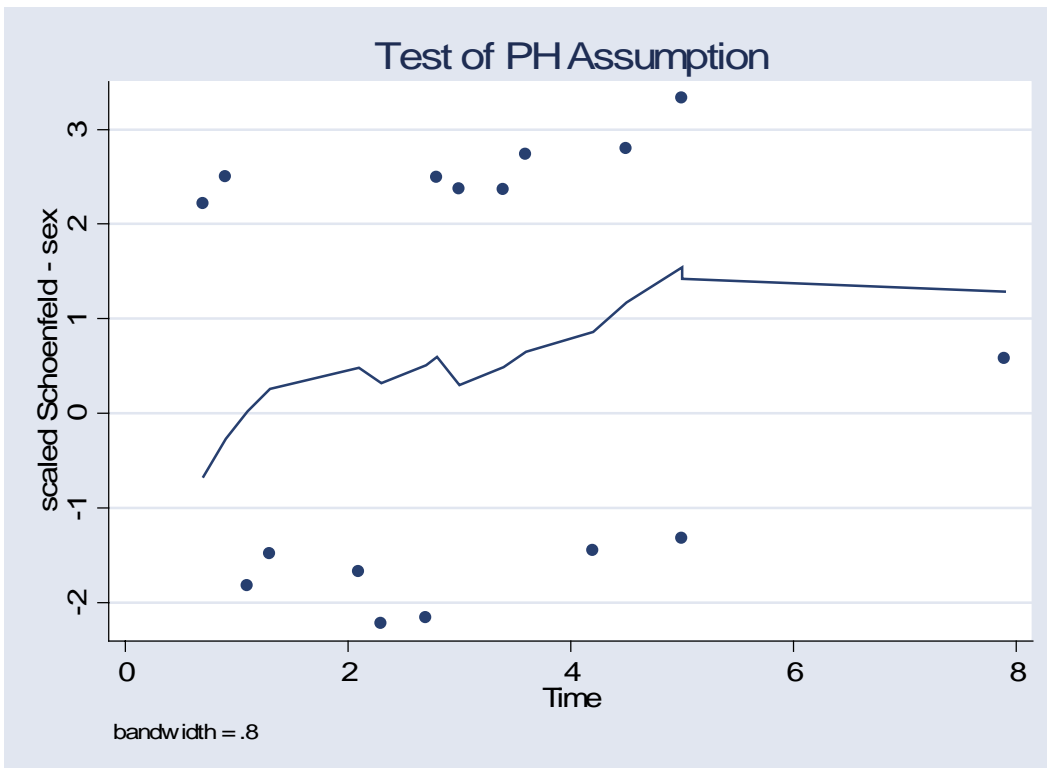
. stphtest, plot(age)



```
.stphtest, log plot(age) yline(0)
```



```
.stphtest, plot(sex)
```



```
. stphtest, rank
```

```
Test of proportional hazards assumption
```

```
Time: Rank(t)
```

	chi2	df	Prob>chi2
global test	0.80	2	0.6687