

```
In [1]: import stata_setup
stata_setup.config("C:/Program Files/StataNow19", "se")
```

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/ / / __/ / / __/
StataNow 19.5
SE-Standard Edition

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Notes:

1. Unicode is supported; see help unicode_advice.
2. Maximum number of variables is set to 5,000 but can be increased;
see help set_maxvar.

```
In [2]: # CRUDE ANALYSIS OF eGFR TRAJECTORIES (INCLUDING SPLINES)
```

```
In [3]: %%stata
clear
cd "C:\Documenti\Furian\DECK"
use deck_long, replace
keep if pz_categoria == 2 | pz_categoria == 4
* Optional: sort data for plotting
sort id mese
* Set up the plot command
local plotcmd ""
* Loop over each individual
levelsof id, local(ids)
foreach i of local ids {
    * Get the category for this individual
    quietly summarize pz_categoria if id == `i'
    local cat = r(mean)
    * Choose color based on category
    local color = cond(`cat' == 4, "stc2", "stc1")
    * Add line for this individual to the plot command
    local plotcmd `plotcmd' || line eGFR_EPI2021 mese if id == `i', lcolor(`color')
}
qui unique mese
global distinct = r(unique)
makespline rcs mese, distinct($distinct)
matrix list r(knots)
qui mixed eGFR_EPI2021 ib4.pz_categoria##(c._rs_rcs_1 c._rcs_1_*) || id: _rs_rcs_1
qui test _b[2.pz_categoria#c._rs_rcs_1] = 0, small
test _b[2.pz_categoria#c._rcs_1_1]=0, small accum
local p_int = r(p)
local spval_int = string(`p_int', "%3.2f")
di `spval_int'
contrast pz_categoria, small
local p_avg = el(r(p),1,1)
```

```
local spval_avg = string(`p_avg', "%3.2f")
di `spval_avg'
local atlist
mkmat _rs_rcs_1 _rcs_1_1 in 1/$distinct,matrix(A)
forvalues i = 1/8 {
    local x1 = A[`i',1]
    local x2 = A[`i',2]
    local atlist `atlist' at(_rs_rcs_1= `x1' _rcs_1_1=`x2')
}
margins, `atlist' over(pz_categoria) saving(marg_egfr_sc, replace)
append using marg_egfr_sc
recode _at (1 = 1) (2 = 3) (3 = 6) (4 = 12) (5 = 24) (6 = 36) (7 = 48) (8 = 60)
sort id _rs_rcs_
tw line _margin_at if _by1 == 2, lcolor(stc1) || ///
line _margin_at if _by1 == 4, lcolor(stc2) || ///
scatter _margin_at if _by1 == 2, msymbol(i) mcolor(stc1) || ///
scatter _margin_at if _by1 == 4, msymbol(i) mcolor(stc2) || ///
rarea _ci_ub _ci_lb _at if _by1 == 2, color(stc1%20) lcolor(white) || ///
rarea _ci_ub _ci_lb _at if _by1 == 4, color(stc2%20) lcolor(white) || ///
`plotcmd' || ///
, ///
    xtitle("Month since Transplant") xlab(0 ` " " "Tx" 1 3 6 12 24 36 48 60
ytitle("eGFR ml/min/1.73m{sup:2}") ylabel(0 15 30 45 60 90 120) ///
legend(order(1 "CIK recipient" 2 "LD recipient")) ///
    title("") ///
    text(3 36 "P value for different slopes=`spval_int'") ///
    note("Non-Adjusted analysis" "")
```

```
. clear

. cd "C:\Documenti\Furian\DECK"
C:\Documenti\Furian\DECK

. use deck_long, replace

. keep if pz_categoria == 2 | pz_categoria == 4
(1,062 observations deleted)

. * Optional: sort data for plotting
. sort id mese

. * Set up the plot command
. local plotcmd ""

. * Loop over each individual
. levelsof id, local(ids)
35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 6
> 1 62 63 64 65 66 67 68 97 98 99 100 101 102 103 104 105 106 107 108 109 110 1
> 11 112 113 114 115 116 117 118

. foreach i of local ids {
    2.      * Get the category for this individual
.     quietly summarize pz_categoria if id == `i'
    3.      local cat = r(mean)
    4.      * Choose color based on category
.     local color = cond(`cat' == 4, "stc2", "stc1")
    5.      * Add line for this individual to the plot command
.     local plotcmd `plotcmd' || line eGFR_EPI2021 mese if id == `i', lcolor(`color'%30) lwidth(thin)
> 6. }

. qui unique mese

. global distinct = r(unique)

. makespline rcs mese, distinct($distinct)
warning: You have entered variable mese as continuous but it only has 9
integer values.

. matrix list r(knots)

r(knots)[1,3]
      c1  c2  c3
r1    6   24   48

. qui mixed eGFR_EPI2021 ib4.pz_categoria##(c._rs_rcs_1 c._rcs_1_*) || id: _rs
> _rcs_1, cov(unstr) reml dfm(kroger)

. qui test _b[2.pz_categoria#c._rs_rcs_1] = 0, small

. test _b[2.pz_categoria#c._rcs_1_1]=0, small accum

( 1) [eGFR_EPI2021]2.pz_categoria#c._rs_rcs_1 = 0
( 2) [eGFR_EPI2021]2.pz_categoria#c._rcs_1_1 = 0

F(  2, 75.14) =      0.68
Prob > F =      0.5084
```

```
. local p_int = r(p)

. local spval_int = string(`p_int', "%3.2f")

. di `spval_int'
.51

. contrast pz_categoria, small
```

Contrasts of marginal linear predictions

Margins: asbalanced

	df	ddf	F	P>F
eGFR_EPI2021				
1 53.75 0.11 0.7379				

```
. local p_avg = el(r(p),1,1)

. local spval_avg = string(`p_avg', "%3.2f")

. di `spval_avg'
.74

. local atlist

. mkmat _rs_rcs_1 _rcs_1_1 in 1/$distinct,matrix(A)

. forvalues i = 1/8 {
    2. local x1 = A[`i',1]
    3. local x2 = A[`i',2]
    4. local atlist `atlist' at(_rs_rcs_1= `x1' _rcs_1_1= `x2')
    5. }

. margins, `atlist' over(pz_categoria) saving(marg_egfr_sc, replace)
```

Predictive margins

Number of obs = 244

```
Expression: Linear prediction, fixed portion, predict()
Over: pz_categoria
1._at: 2.pz_categoria
      _rs_rcs_1 = 0
      _rcs_1_1 = 0
4.pz_categoria
      _rs_rcs_1 = 0
      _rcs_1_1 = 0
2._at: 2.pz_categoria
      _rs_rcs_1 = .028169
      _rcs_1_1 = 0
4.pz_categoria
      _rs_rcs_1 = .028169
      _rcs_1_1 = 0
3._at: 2.pz_categoria
      _rs_rcs_1 = .0704225
      _rcs_1_1 = 7.64e-51
4.pz_categoria
      _rs_rcs_1 = .0704225
```

```

        _rcs_1_1 = 7.64e-51
4._at: 2.pz_categoria
        _rs_rcs_1 = .1549296
        _rcs_1_1 = .0017246
4.pz_categoria
        _rs_rcs_1 = .1549296
        _rcs_1_1 = .0017246
5._at: 2.pz_categoria
        _rs_rcs_1 = .3239437
        _rcs_1_1 = .0465651
4.pz_categoria
        _rs_rcs_1 = .3239437
        _rcs_1_1 = .0465651
6._at: 2.pz_categoria
        _rs_rcs_1 = .4929577
        _rcs_1_1 = .1914343
4.pz_categoria
        _rs_rcs_1 = .4929577
        _rcs_1_1 = .1914343
7._at: 2.pz_categoria
        _rs_rcs_1 = .6619718
        _rcs_1_1 = .3983903
4.pz_categoria
        _rs_rcs_1 = .6619718
        _rcs_1_1 = .3983903
8._at: 2.pz_categoria
        _rs_rcs_1 = .8309859
        _rcs_1_1 = .6156942
4.pz_categoria
        _rs_rcs_1 = .8309859
        _rcs_1_1 = .6156942

```

	Delta-method					
	Margin	std. err.	z	P> z	[95% conf. interval]	
_at#						
pz_categoria						
1 #						
CIK recip..	65.32899	4.07793	16.02	0.000	57.3364	73.32159
2 #						
LD recipi..	63.16717	4.964995	12.72	0.000	53.43596	72.89838
3 #						
CIK recip..	64.86202	3.971905	16.33	0.000	57.07723	72.64681
4 #						
LD recipi..	63.25509	4.82002	13.12	0.000	53.80803	72.70216
5 #						
CIK recip..	64.16157	3.850346	16.66	0.000	56.61503	71.70811
6 #						
LD recipi..	63.38697	4.648902	13.63	0.000	54.27529	72.49866
7 #						
CIK recip..	62.80557	3.752653	16.74	0.000	55.45051	70.16063
8 #						
LD recipi..	63.66646	4.489475	14.18	0.000	54.86725	72.46567
9 #						
CIK recip..	61.17144	3.958629	15.45	0.000	53.41267	68.93021
10 #						
64.60274	4.660585	13.86	0.000	55.46816	73.73732	
11 #						
CIK recip..	62.14217	4.41951	14.06	0.000	53.48008	70.80425

	6 #	LD recipi..	66.45086	5.363643	12.39	0.000	55.93831	76.9634
	7 #	CIK recip..	64.72969	5.629717	11.50	0.000	53.69565	75.76373
	7 #	LD recipi..	68.86494	7.621978	9.04	0.000	53.92614	83.80374
	8 #	CIK recip..	67.58668	7.469721	9.05	0.000	52.9463	82.22707
	8 #	LD recipi..	71.37336	10.84117	6.58	0.000	50.12506	92.62165

```

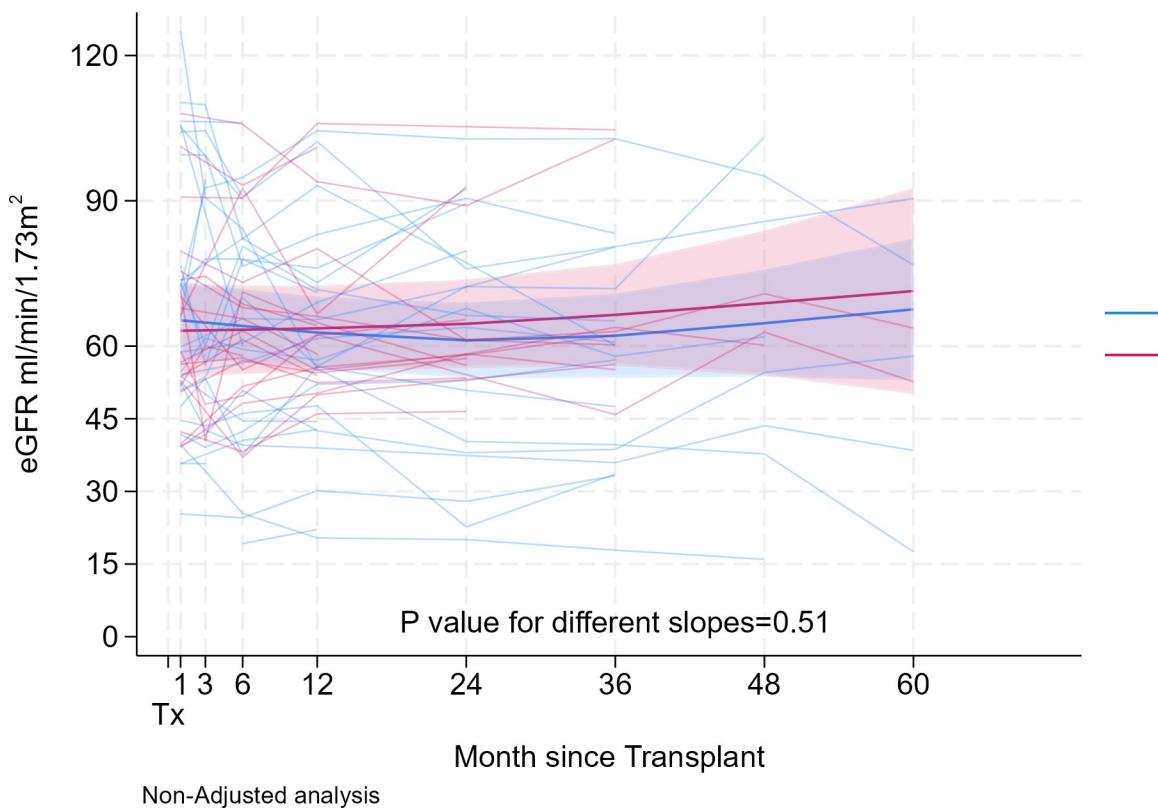
. append using marg_egfr_sc
(label pz_categoria already defined)

. recode _at (1 = 1) (2 = 3) (3 = 6) (4 = 12) (5 = 24) (6 = 36) (7 = 48) (8 = 6
> 0)
(14 changes made to _at)

. sort id _rs_rcs_

. tw line _margin _at if _by1 == 2, lcolor(stc1) || ///
>     line _margin _at if _by1 == 4, lcolor(stc2) || ///
>     scatter _margin _at if _by1 == 2, msymbol(i) mcolor(stc1) || ///
>     scatter _margin _at if _by1 == 4, msymbol(i) mcolor(stc2) || ///
>     rarea _ci_ub _ci_lb _at if _by1 == 2, color(stc1%20) lcolor(white) || //
> /
>     rarea _ci_ub _ci_lb _at if _by1 == 4, color(stc2%20) lcolor(white) || /
> //
>     `plotcmd' || ///
>     , ///
>         xtitle("Month since Transplant") xlab(0 ` " " "Tx" 1 3 6 12 24 36 48
> 60, labsize(*1)) xsc(range (-1 60)) ///
>     ytitle("eGFR ml/min/1.73m{sup:2}") ylabel(0 15 30 45 60 90 120) ///
>     legend(order(1 "CIK recipient" 2 "LD recipient")) ///
>         title("") ///
>         text(3 36 "P value for different slopes=`spval_int'") ///
>     note("Non-Adjusted analysis" "")
```

.



```
In [4]: # ADJUSTED ANALYSIS OF eGFR TRAJECTORIES (INCLUDING SPLINES)
```

```
% stata
clear
cd "C:\Documenti\Furian\DECK"
use deck_long, replace

keep if pz_categoria == 2 | pz_categoria == 4

* Optional: sort data for plotting
sort id mese
* Set up the plot command
local plotcmd ""
* Loop over each individual
levelsof id, local(ids)
foreach i of local ids {
    * Get the category for this individual
    quietly summarize pz_categoria if id == `i'
    local cat = r(mean)
    * Choose color based on category
    local color = cond(`cat' == 4, "stc2", "stc1")
    * Add line for this individual to the plot command
    local plotcmd `plotcmd' || line eGFR_EPI2021 mese if id == `i', lcolor(`color')
}
unique mese
global distinct = r(unique)
makespline rcs mese, distinct($distinct)
matrix list r(knots)

foreach var of varlist don_quality_score don_eta ric_CIT ric_eta ric_PRA {
    qui summ `var'
    replace `var' = (`var' - r(mean)) / r(sd)
```

```
        }
* compare deviance between model with spline term and model with only linear ter
qui mixed eGFR_EPI2021 ib4.pz_categoria##(c.mese) ///
    c.don_quality_score c.don_eta c.ric_CIT i.volume_attivitàDEC_centrotx ///
    c.ric_eta i.ric_sesso c.ric_PRA || id: c.mese, cov(unstr) reml dfm(krog
estimates stat, aicconsistent
qui mixed eGFR_EPI2021 ib4.pz_categoria##(c._rs_rcs_1 c._rcs_1_*) ///
    c.don_quality_score c.don_eta c.ric_CIT i.volume_attivitàDEC_centrotx ///
    c.ric_eta i.ric_sesso c.ric_PRA || id: _rs_rcs_1, cov(unstr) reml dfm(kr
est store m_spline
estimates stat, aicconsistent
qui test _b[2.pz_categoria#c._rs_rcs_1] = 0, small
test _b[2.pz_categoria#c._rcs_1_1]=0, small accum
local p_int = r(p)
local spval_int = string(`p_int', "%3.2f")
di `spval_int'
contrast pz_categoria, small
local p_avg = el(r(p),1,1)
local spval_avg = string(`p_avg', "%3.2f")
di `spval_avg'
local atlist
mkmat _rs_rcs_1 _rcs_1_1 in 1/$distinct, matrix(A)
forvalues i = 1/8 {
    local x1 = A[`i',1]
    local x2 = A[`i',2]
    local atlist `atlist' at(_rs_rcs_1= `x1' _rcs_1_1=`x2')
}
margins, `atlist' over(pz_categoria) saving(marg_egfr_sc, replace)
append using marg_egfr_asc
recode _at (1 = 1) (2 = 3) (3 = 6) (4 = 12) (5 = 24) (6 = 36) (7 = 48) (8 = 60)
sort id _rs_rcs_
tw line _margin_at if _by1 == 2, lcolor(stc1) || ///
    line _margin_at if _by1 == 4, lcolor(stc2) || ///
    scatter _margin_at if _by1 == 2, msymbol(i) mcolor(stc1) || ///
    scatter _margin_at if _by1 == 4, msymbol(i) mcolor(stc2) || ///
    rarea _ci_ub _ci_lb _at if _by1 == 2, color(stc1%20) lcolor(white) || ///
    rarea _ci_ub _ci_lb _at if _by1 == 4, color(stc2%20) lcolor(white) || ///
`plotcmd' || ///
, ///
    xtitle("Month since Transplant") xlab(0 ` " " "Tx" 1 3 6 12 24 36 48 60
ytitle("eGFR ml/min/1.73m{sup:2}") ylabel(0 15 30 45 60 90 120) ///
legend(order(1 "CIK recipient" 2 "LD recipient")) ///
    title("") ///
    text(3 40 "P value for different slopes=`spval_int'") ///
    note("Adjusted for donor quality (LDKPI/KDPI), Donor age, Cold ischemia
```

```
. clear

. cd "C:\Documenti\Furian\DECK"
C:\Documenti\Furian\DECK

. use deck_long, replace

.

. keep if pz_categoria == 2 | pz_categoria == 4
(1,062 observations deleted)

.

. * Optional: sort data for plotting
. sort id mese

. * Set up the plot command
. local plotcmd ""

. * Loop over each individual
. levelsof id, local(ids)
35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 6
> 1 62 63 64 65 66 67 68 97 98 99 100 101 102 103 104 105 106 107 108 109 110 1
> 11 112 113 114 115 116 117 118

. foreach i of local ids {
    2.      * Get the category for this individual
.     quietly summarize pz_categoria if id == `i'
    3.      local cat = r(mean)
    4.      * Choose color based on category
.     local color = cond(`cat' == 4, "stc2", "stc1")
    5.      * Add line for this individual to the plot command
.     local plotcmd `plotcmd' || line eGFR_EPI2021 mese if id == `i', lcolor(`color'%30) lwidth(thin)
> color'%30) lwidth(thin)
    6. }

. unique mese
Number of unique values of mese is  9
Number of records is  504

. global distinct = r(unique)

. makespline rcs mese, distinct($distinct)
warning: You have entered variable mese as continuous but it only has 9
integer values.

. matrix list r(knots)

r(knots)[1,3]
    c1  c2  c3
r1    6   24   48

.

. foreach var of varlist don_quality_score don_eta ric_CIT ric_eta ric_PRA {
    2.          qui summ `var'
    3.          replace `var' = (`var' - r(mean)) / r(sd)
    4.        }
(504 real changes made)
variable don_eta was byte now float
(504 real changes made)
```

```

variable ric_CIT was int now float
(486 real changes made)
variable ric_eta was byte now float
(504 real changes made)
variable ric_PRA was byte now float
(504 real changes made)

. * compare deviance between model with spline term and model with only linear
> term
. qui mixed eGFR_EPI2021 ib4.pz_categoria##(c.mese) ///
>           c.don_quality_score c.don_eta c.ric_CIT i.volume_attivitàDEC_centrotx
>   ///
>           c.ric_eta i.ric_sesso c.ric_PRA || id: c.mese, cov(unstr) reml dfm(k
> roger)

. estimates stat, aicconsistent

```

Consistent Akaike's information criterion and Bayesian information criterion

Model	N	ll(null)	ll(model)	df	CAIC	BIC
.	244	.	-947.2514	15	1991.96	1976.96

Note: CAIC and BIC use N = number of observations. See [R] IC note.

```

. qui mixed eGFR_EPI2021 ib4.pz_categoria##(c._rs_rcs_1 c._rcs_1_*) ///
>           c.don_quality_score c.don_eta c.ric_CIT i.volume_attivitàDEC_centrotx
>   ///
>           c.ric_eta i.ric_sesso c.ric_PRA || id: _rs_rcs_1, cov(unstr) reml dfm
> (kroger)

. est store m_spline

. estimates stat, aicconsistent

```

Consistent Akaike's information criterion and Bayesian information criterion

Model	N	ll(null)	ll(model)	df	CAIC	BIC
m_spline	244	.	-929.4457	17	1969.343	1952.343

Note: CAIC and BIC use N = number of observations. See [R] IC note.

```

. qui test _b[2.pz_categoria#c._rs_rcs_1] = 0, small
. test _b[2.pz_categoria#c._rcs_1_1]=0, small accum

( 1) [eGFR_EPI2021]2.pz_categoria#c._rs_rcs_1 = 0
( 2) [eGFR_EPI2021]2.pz_categoria#c._rcs_1_1 = 0

F( 2, 77.26) =     0.74
Prob > F =     0.4786

. local p_int = r(p)
. local spval_int = string(`p_int', "%3.2f")
. di `spval_int'

```

.48

```
. contrast pz_categoria, small

Contrasts of marginal linear predictions
```

Margins: asbalanced

	df	ddf	F	P>F
eGFR_EPI2021				
pz_categoria	1	48.24	0.03	0.8708

```
. local p_avg = el(r(p),1,1)

. local spval_avg = string(`p_avg', "%3.2f")

. di `spval_avg'
.87

. local atlist

. mkmat _rs_rcs_1 _rcs_1_1 in 1/$distinct, matrix(A)

. forvalues i = 1/8 {
  2.         local x1 = A[`i',1]
  3.         local x2 = A[`i',2]
  4.         local atlist `atlist' at(_rs_rcs_1= `x1' _rcs_1_1= `x2')
  5.     }

. margins, `atlist' over(pz_categoria) saving(marg_egfr_sc, replace)
```

Predictive margins

Number of obs = 244

Expression: Linear prediction, fixed portion, predict()

Over: pz_categoria

```
1._at: 2.pz_categoria
      _rs_rcs_1 =      0
      _rcs_1_1 =      0
4.pz_categoria
      _rs_rcs_1 =      0
      _rcs_1_1 =      0
2._at: 2.pz_categoria
      _rs_rcs_1 = .028169
      _rcs_1_1 =      0
4.pz_categoria
      _rs_rcs_1 = .028169
      _rcs_1_1 =      0
3._at: 2.pz_categoria
      _rs_rcs_1 = .0704225
      _rcs_1_1 = 7.64e-51
4.pz_categoria
      _rs_rcs_1 = .0704225
      _rcs_1_1 = 7.64e-51
4._at: 2.pz_categoria
      _rs_rcs_1 = .1549296
      _rcs_1_1 = .0017246
4.pz_categoria
```

```

        _rs_rcs_1 = .1549296
        _rcs_1_1  = .0017246
5._at: 2.pz_categoria
        _rs_rcs_1 = .3239437
        _rcs_1_1  = .0465651
4.pz_categoria
        _rs_rcs_1 = .3239437
        _rcs_1_1  = .0465651
6._at: 2.pz_categoria
        _rs_rcs_1 = .4929577
        _rcs_1_1  = .1914343
4.pz_categoria
        _rs_rcs_1 = .4929577
        _rcs_1_1  = .1914343
7._at: 2.pz_categoria
        _rs_rcs_1 = .6619718
        _rcs_1_1  = .3983903
4.pz_categoria
        _rs_rcs_1 = .6619718
        _rcs_1_1  = .3983903
8._at: 2.pz_categoria
        _rs_rcs_1 = .8309859
        _rcs_1_1  = .6156942
4.pz_categoria
        _rs_rcs_1 = .8309859
        _rcs_1_1  = .6156942

```

	Delta-method					
	Margin	std. err.	z	P> z	[95% conf. interval]	
_at#						
pz_categoria						
1 #						
CIK recip..	65.15553	3.846234	16.94	0.000	57.61705	72.69401
1 #						
LD recipi..	63.08981	4.606523	13.70	0.000	54.0612	72.11843
2 #						
CIK recip..	64.68031	3.708492	17.44	0.000	57.4118	71.94882
2 #						
LD recipi..	63.19793	4.424807	14.28	0.000	54.52547	71.87039
3 #						
CIK recip..	63.96748	3.538792	18.08	0.000	57.03158	70.90339
3 #						
LD recipi..	63.3601	4.198876	15.09	0.000	55.13045	71.58975
4 #						
CIK recip..	62.58708	3.350693	18.68	0.000	56.01984	69.15432
4 #						
LD recipi..	63.69861	3.941777	16.16	0.000	55.97286	71.42435
5 #						
CIK recip..	60.91244	3.424149	17.79	0.000	54.20123	67.62365
5 #						
LD recipi..	64.71546	3.987783	16.23	0.000	56.89955	72.53137
6 #						
CIK recip..	61.86269	3.81459	16.22	0.000	54.38624	69.33915
6 #						
LD recipi..	66.55362	4.662614	14.27	0.000	57.41506	75.69217
7 #						
CIK recip..	64.4422	5.075831	12.70	0.000	54.49375	74.39064
7 #						

LD recipi..	68.90154	7.043361	9.78	0.000	55.09681	82.70627
8 #						
CIK recip..	67.29324	7.000926	9.61	0.000	53.57168	81.0148
8 #						
LD recipi..	71.33443	10.35818	6.89	0.000	51.03276	91.6361

```

. append using marg_egfr_asc
(label pz_categoria already defined)
(label volume_attivitàDEC_centrotx already defined)

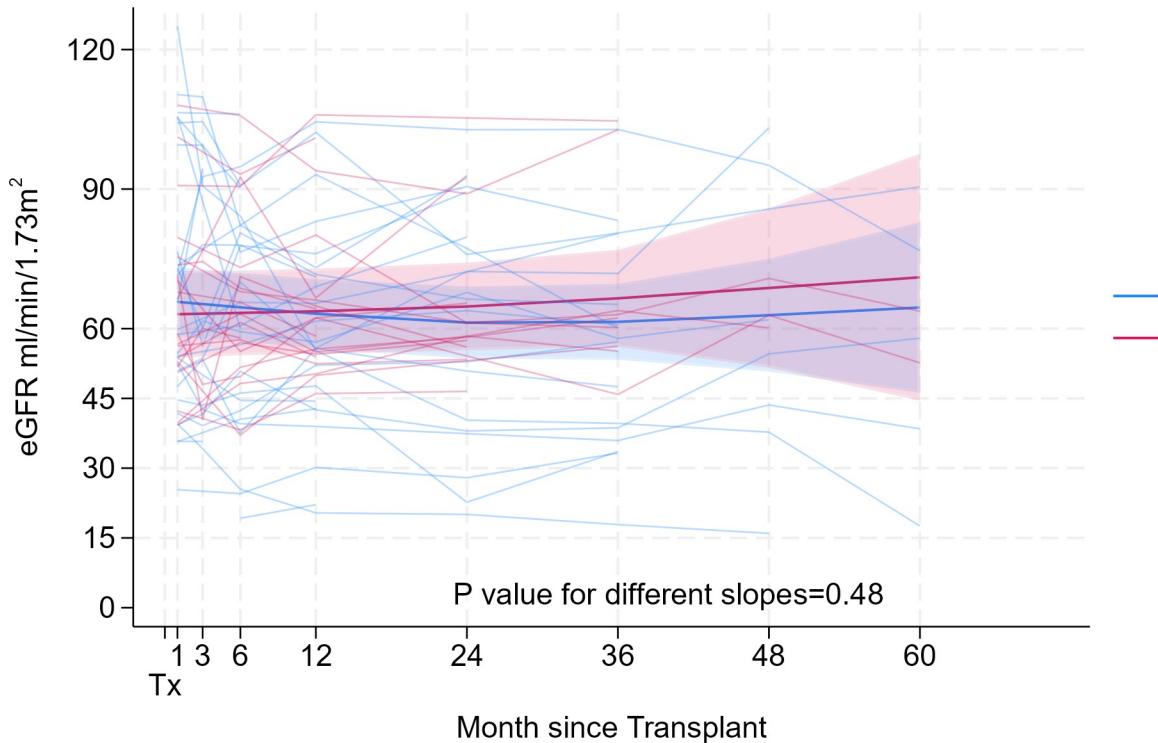
. recode _at (1 = 1) (2 = 3) (3 = 6) (4 = 12) (5 = 24) (6 = 36) (7 = 48) (8 = 6
> 0)
(14 changes made to _at)

. sort id _rs_rcs_

. tw line _margin _at if _by1 == 2, lcolor(stc1) || ///
>   line _margin _at if _by1 == 4, lcolor(stc2) || ///
>   scatter _margin _at if _by1 == 2, msymbol(i) mcolor(stc1) || ///
>   scatter _margin _at if _by1 == 4, msymbol(i) mcolor(stc2) || ///
>   rarea _ci_ub _ci_lb _at if _by1 == 2, color(stc1%20) lcolor(white) || //
> /
>   rarea _ci_ub _ci_lb _at if _by1 == 4, color(stc2%20) lcolor(white) || /
> //'
>   `plotcmd' || ///
>   , ///
>       xtitle("Month since Transplant") xlab(0 `'' "Tx" 1 3 6 12 24 36 48
> 60, labsiz(*1)) xsc(range (-1 60)) ///
>       ytitle("eGFR ml/min/1.73m{sup:2}") ylabel(0 15 30 45 60 90 120) ///
>       legend(order(1 "CIK recipient" 2 "LD recipient")) ///
>           title("") ///
>           text(3 40 "P value for different slopes=`spval_int'") ///
>           note("Adjusted for donor quality (LDKPI/KDPI), Donor age, Cold ischemia time, Center volume," "Recipient age, sex and cPRA")

.

```



```
In [9]: # CRUDE DIFFERENCE BETWEEN LINEAR eGFR SLOPES (NOT INCLUDING SPLINES)
```

```
In [10]: %%stata
clear
cd "C:\Documenti\Furian\DECK"
use deck_long, replace
keep if pz_categoria == 2 | pz_categoria == 4
qui mixed eGFR_EPI2021 ib4.pz_categoria##(c.mese) || id: c.mese, cov(unstr) rem
lincom _b[2.pz_categoria#c.mese] * 12, small sformat(%3.2f) pformat(%3.2f) cform
```

```
. clear  
  
. cd "C:\Documenti\Furian\DECK"  
C:\Documenti\Furian\DECK  
  
. use deck_long, replace  
  
. keep if pz_categoria == 2 | pz_categoria == 4  
(1,062 observations deleted)  
  
. qui mixed eGFR_EPI2021 ib4.pz_categoria##(c.mese) || id: c.mese, cov(unstr)  
> reml dfm(kroger)  
  
. lincom _b[2.pz_categoria#c.mese] * 12, small sformat(%3.2f) pformat(%3.2f) cf  
> ormat(%3.1f)  
  
( 1) 12*[eGFR_EPI2021]2.pz_categoria#c.mese = 0  
  
-----  
eGFR_EPI2021 | Coefficient Std. err. t P>|t| [95% conf. interval]  
-----+-----  
(1) | -1.9 2.2 -0.87 0.39 -6.3 2.5  
-----  
  
.
```

In [11]: # ADJUSTED DIFFERENCE BETWEEN LINEAR eGFR SLOPES (NOT INCLUDING SPLINES)

```
%%stata  
clear  
cd "C:\Documenti\Furian\DECK"  
use deck_long, replace  
keep if pz_categoria == 2 | pz_categoria == 4  
qui mixed eGFR_EPI2021 ib4.pz_categoria##(c.mese) ///  
    c.don_quality_score c.don_eta c.ric_CIT i.volume_attivitàDEC_centrotx //  
    c.ric_eta i.ric_sesso c.ric_PRA || id: c.mese, cov(unstr) reml dfm(krog  
lincom _b[2.pz_categoria#c.mese] * 12, small sformat(%3.2f) pformat(%3.2f) cf
```

```

. clear

. cd "C:\Documenti\Furian\DECK"
C:\Documenti\Furian\DECK

. use deck_long, replace

. keep if pz_categoria == 2 | pz_categoria == 4
(1,062 observations deleted)

. qui mixed eGFR_EPI2021 ib4.pz_categoria##(c.mese) ///
>           c.don_quality_score c.don_eta c.ric_CIT i.volume_attivitàDEC_centrotx
>   ///
>           c.ric_eta i.ric_sesso c.ric_PRA || id: c.mese, cov(unstr) reml dfm(k
> roger)

. lincom _b[2.pz_categoria#c.mese] * 12, small sformat(%3.2f) pformat(%3.2f) cf
> ormat(%3.1f)

( 1) 12*[eGFR_EPI2021]2.pz_categoria#c.mese = 0

-----
eGFR_EPI2021 | Coefficient Std. err.      t     P>|t|      [95% conf. interval]
-----+
(1) |      -2.0      2.2     -0.91     0.37      -6.5      2.4
-----+

```

.

In [13]: `## SURVIVAL ANALYSIS (KAPLAN-MEIER PLOT AND LOG-RANK TEST) AND CRUDE HR FROM COX`

```

In [14]: %%stata
clear
cd "C:\Documenti\Furian\DECK"
use deck_trasv, replace
keep if pz_categoria == 2 | pz_categoria == 4
qui sts test pz_categoria, logrank
local p_logrank = chi2tail(r(df), r(chi2))
local spval_logrank = string(`p_logrank', "%3.2f")
di `spval_logrank'
qui stcox ib4.pz_categoria
* check PH assumption
estat phtest
lincom _b[2.pz_categoria], hr cformat(%3.2f) pformat(%3.2f) sformat(%3.2f)
qui streset, sc(30.4375)
sts graph, by(pz_categoria) risktable ///
xtitle("Month since Transplant") xsc(titlegap(1)) ///
xlab(0 `"Tx'" 1 3 6 12 24 36 48 60, labsize(*1)) tmax(60) ///
ytitle("Transplant Survival (%))" ) ///
ylab(0 "0" .2 "20" .4 "40" .6 "60" .8 "80" 1 "100") ///
ci ///
plot1opts(lwidth(*1.4)) plot2opts(lwidth(*1.4)) ///
ci1opts(color(stc1%20)) ci2opts(color(stc2%20)) ///
risktable(), title("N at risk", size(*.8)) ///
risktable(), color(stc1) group(#1) size(*.7)) ///
risktable(), color(stc2) group(#2) size(*.7)) ///
risktable(), rowtitle("CIK Rec: ") group(#1) size(*.8)) ///
risktable(), rowtitle("LD Rec: ") group(#2) size(*.8)) ///
legend(order(5 "CIK recipient" 6 "LD Recipient") pos(6) rows(1)) ///
text(.05 40 "Log-rank test, P value=`spval_logrank'" ) ///

```

```
title("")
```

```

. clear

. cd "C:\Documenti\Furian\DECK"
C:\Documenti\Furian\DECK

. use deck_trasv, replace

. keep if pz_categoria == 2 | pz_categoria == 4
(118 observations deleted)

. qui sts test pz_categoria, logrank

. local p_logrank = chi2tail(r(df), r(chi2))

. local spval_logrank = string(`p_logrank', "%3.2f")

. di `spval_logrank'
.28

. qui stcox ib4.pz_categoria

. * check PH assumption
. estat phtest

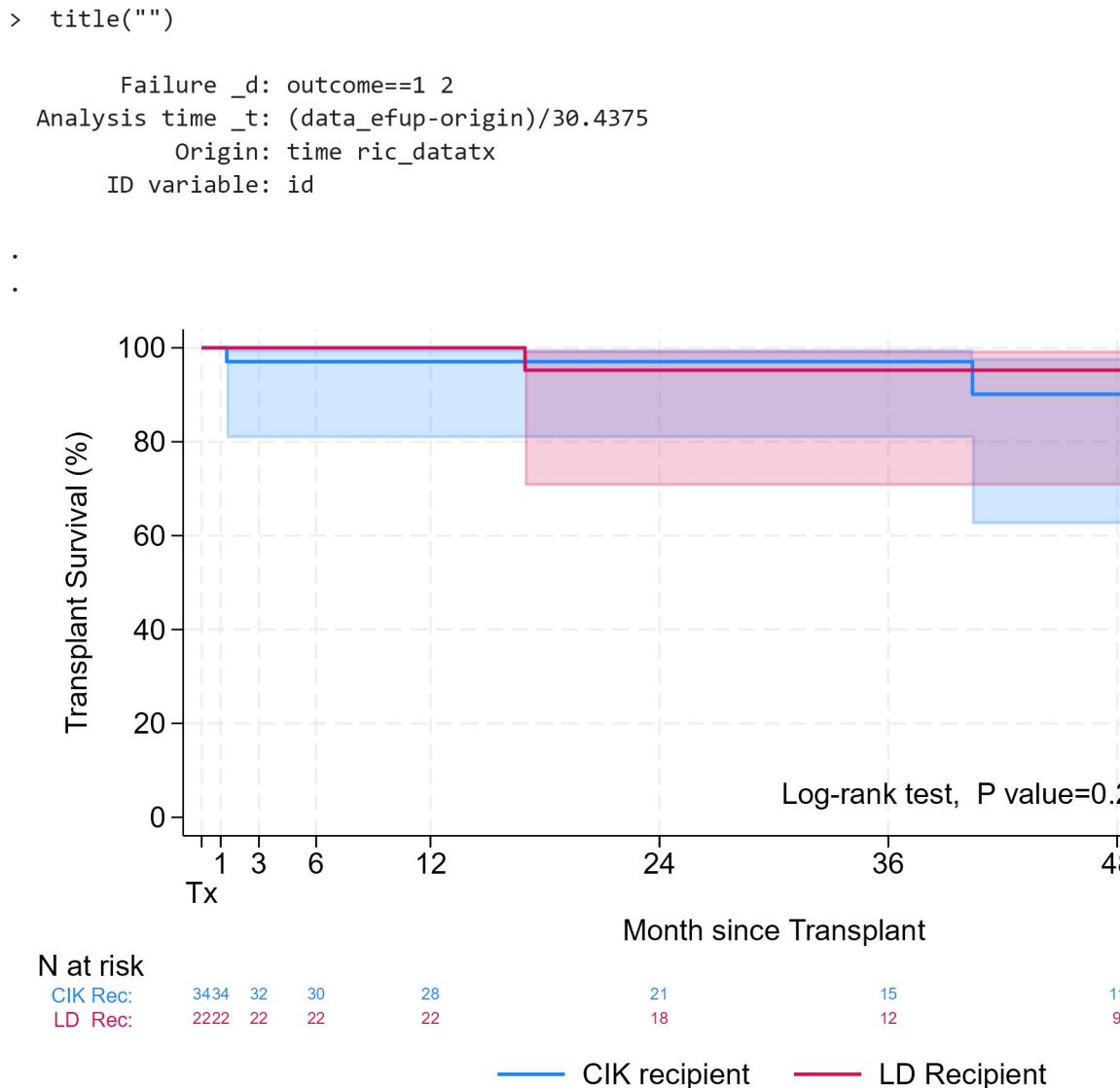
Test of proportional-hazards assumption

Time function: Analysis time
-----
|      chi2      df      Prob>chi2
-----+-----+-----+
Global test |      0.82      1      0.3662
-----+-----+
. lincom _b[2.pz_categoria], hr cformat(%3.2f) pformat(%3.2f) sformat(%3.2f)
( 1) 2.pz_categoria = 0

-----
_t | Haz. ratio      Std. err.      z      P>|z|      [95% conf. interval]
-----+-----+-----+-----+-----+-----+
(1) |      3.13      3.51      1.02      0.31      0.35      28.09
-----+-----+
. qui streset, sc(30.4375)

. sts graph, by(pz_categoria) risktable ///
> xtitle("Month since Transplant") xsc(titlegap(1)) ///
> xlabel(0 `" " "Tx" 1 3 6 12 24 36 48 60, labsize(*1)) tmax(60) ///
> ytitle("Transplant Survival (%))" ///
> ylab(0 "0" .2 "20" .4 "40" .6 "60" .8 "80" 1 "100") ///
> ci ///
> plot1opts(lwidth(*1.4)) plot2opts(lwidth(*1.4)) ///
> ci1opts(color(stc1%20)) ci2opts(color(stc2%20)) ///
> risktable(), title("N at risk", size(*.8))) ///
> risktable(), color(stc1) group(#1) size(*.7)) ///
> risktable(), color(stc2) group(#2) size(*.7)) ///
> risktable(), rowtitle("CIK Rec: ") group(#1) size(*.8)) ///
> risktable(), rowtitle("LD Rec: ") group(#2) size(*.8)) ///
> legend(order(5 "CIK recipient" 6 "LD Recipient") pos(6) rows(1)) ///
> text(.05 40 "Log-rank test, P value=`spval_logrank'" ) ///

```



In [15]: # ADJUSTED HR FROM COX PH REGRESSION

In [16]:

```
% stata
clear
cd "C:\Documenti\Furian\DECK"
use deck_trasv, replace
keep if pz_categoria == 2 | pz_categoria == 4
foreach var of varlist don_quality_score don_eta ric_CIT ric_eta ric_PRA {
    qui summ `var'
    replace `var' = (`var' - r(mean)) / r(sd)
}

qui stcox ib4.pz_categoria c.don_quality_score c.ric_CIT
lincom _b[2.pz_categoria], hr cformat(%3.2f) pformat(%3.2f) sformat(%3.2f)
```

```
. clear

. cd "C:\Documenti\Furian\DECK"
C:\Documenti\Furian\DECK

. use deck_trasv, replace

. keep if pz_categoria == 2 | pz_categoria == 4
(118 observations deleted)

. foreach var of varlist don_quality_score don_eta ric_CIT ric_eta ric_PRA {
    2.         qui summ `var'
    3.         replace `var' = (`var' - r(mean)) / r(sd)
    4.     }
(56 real changes made)
variable don_eta was byte now float
(56 real changes made)
variable ric_CIT was int now float
(54 real changes made)
variable ric_eta was byte now float
(56 real changes made)
variable ric_PRA was byte now float
(56 real changes made)

.

.

.

. qui stcox ib4.pz_categoria c.don_quality_score c.ric_CIT

. lincom _b[2.pz_categoria], hr cformat(%3.2f) pformat(%3.2f) sformat(%3.2f)

( 1) 2.pz_categoria = 0

-----+-----+-----+-----+-----+-----+-----+
      _t | Haz. ratio   Std. err.      z      P>|z|      [95% conf. interval]
-----+-----+-----+-----+-----+-----+-----+
      (1) |       2.25      3.39      0.54      0.59      0.12      43.21
-----+-----+-----+-----+-----+-----+-----+
```

In []: