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

```
  ___  ____  ____  ____  ____ ®
 /__    /   ____/   /   ____/      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 ANALYIS OF eGFR TRAJECTORIES (INCLUDING SPLINES)
```

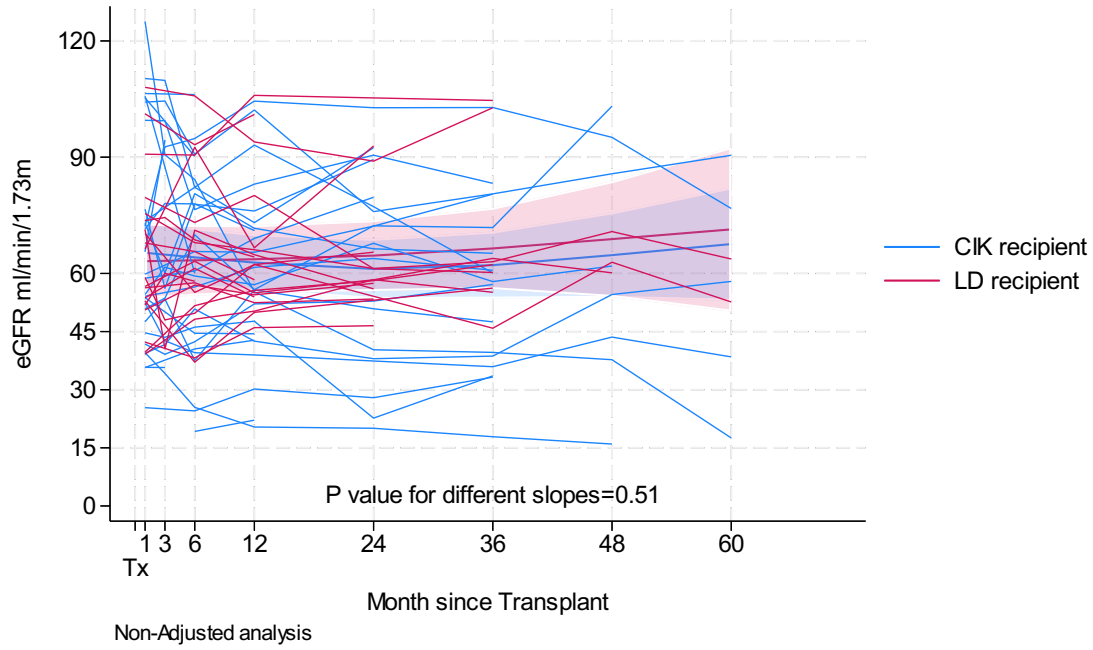
In [3]:

```
%%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'%30) lwidth(thin)
}
qui unique mese
global distinct = r(unique)
makespline rcs mese,  distinct($distinct)
matrix list  r(knots)
qui mixed eGFR_EPI2021 ib4.pz_categoria##(c._rs_rcs_1 c._rcs_1_*)  || id: _rs_rcs_1, cov(unstr) reml dfm(kroger)
qui test _b[2.pz_categoria#c._rs_rcs_1] = 0, small
test _b[2.pz_categoria#c._rcs_1_1]=0, small accum
local p_int = r(p)
local spval_int = string( `p_int', "%3.2f")
di `spval_int'
contrast pz_categoria, small
local p_avg = el(r(p),1,1)
local spval_avg = string( `p_avg', "%3.2f")
di `spval_avg'
local atlist
mkmat _rs_rcs_1 _rcs_1_1 in 1/$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, 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" "")
. clear

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

. use deck_long, replace

. keep if pz_categoria == 2 | pz_categoria == 4
```

```
. 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 1/8, 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
          1 #|
LD recipi.. |   63.16717   4.964995    12.72   0.000     53.43596    72.89838
          2 #|
CIK recip.. |   64.86202   3.971905    16.33   0.000     57.07723    72.64681
          2 #|
LD recipi.. |   63.25509    4.82002    13.12   0.000     53.80803    72.70216
          3 #|
CIK recip.. |   64.16157   3.850346    16.66   0.000     56.61503    71.70811
          3 #|
LD recipi.. |   63.38697   4.648902    13.63   0.000     54.27529    72.49866
          4 #|
```

```
CIK recip.. |  62.80557   3.752653    16.74   0.000     55.45051    70.16063
        4 #|
LD recipi.. |  63.66646   4.489475    14.18   0.000     54.86725    72.46567
        5 #|
CIK recip.. |  61.17144   3.958629    15.45   0.000     53.41267    68.93021
        5 #|
  64.60274   4.660585    13.86   0.000     55.46816    73.73732
        6 #|
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)
In [6]:
%%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'%30) lwidth(thin)
}
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 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(kroger)
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(kroger)
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, 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 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")
. 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. }

. 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. }
```

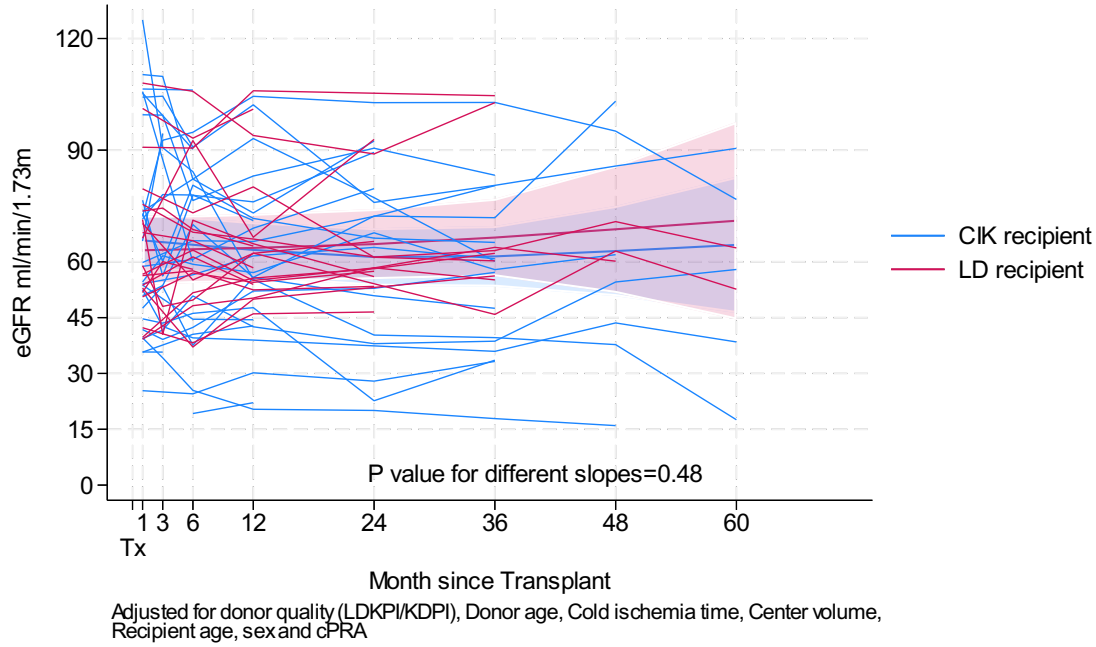
. margins, `atlist' over(pz_categoria) saving(marg_egfr_sc, replace)

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

```
LD recipi.. |  64.71546   3.987783    16.23   0.000    56.89953    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, 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 40 "P value for different slopes=`spval_int'") ///
>        note("Adjusted for donor quality (LDKPI/KDPI), Donor age, Cold ischem
> ia 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) reml dfm(kroger)
lincom _b[2.pz_categoria#c.mese] * 12, small sformat(%3.2f) pformat(%3.2f) cformat(%3.1f)
```

```
. 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)

In [12]:

%%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(kroger)
lincom _b[2.pz_categoria#c.mese] * 12, small sformat(%3.2f) pformat(%3.2f) cformat(%3.1f)
```

```
. 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]:

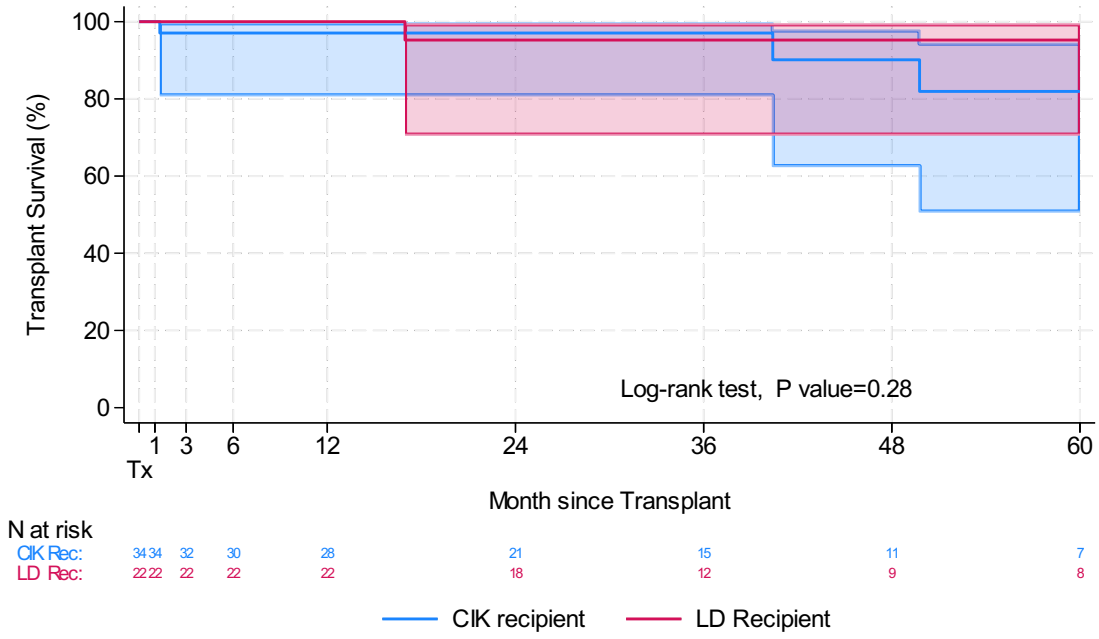
SURVIVAL ANALYSIS (KAPLAN-MEIER PLOT AND LOG-RANK TEST) AND CRUDE HR FROM COX PH REGRESSION

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)) ///
> 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("")

      Failure _d: outcome==1 2
Analysis time _t: (data_efup-origin)/30.4375
      Origin: time ric_datatx
   ID variable: id

.
.
```



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 [ ]: