```
-------------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------
      name:  <unnamed>
       log:  D:\Jason\workshop\scales and indices\2022\stata code.log
  log type:  text
 opened on:  31 Oct 2022, 10:12:04

************************************************************
* Read in the data in which no variables have missing values
************************************************************
.

. webuse bg2, clear
(Physician-cost data)

. des

Contains data from http://www.stata-press.com/data/r15/bg2.dta
  obs:           568                          Physician-cost data
 vars:             7                          11 Feb 2016 21:54
 size:        14,768                          (_dta has notes)
-------------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------
              storage   display    value
variable name   type    format     label      variable label
-------------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------
clinid          int     %9.0g                 Physician identifier
bg2cost1        float   %9.0g                 Best health care is expensive
bg2cost2        float   %9.0g                 Cost is a major consideration
bg2cost3        float   %9.0g                 Determine cost of tests first
bg2cost4        float   %9.0g                 Monitor likely complications only
bg2cost5        float   %9.0g                 Use all means regardless of cost
bg2cost6        float   %9.0g                 Prefer unnecessary tests to missing tests
-------------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------
Sorted by: clinid

. sum

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
      clinid |        568       284.5    164.1118          1        568
    bg2cost1 |        568    9.45e-09           1  -3.097306   3.057153
    bg2cost2 |        568    6.99e-09           1  -3.651067   3.157189
    bg2cost3 |        568   -6.98e-09           1   -3.20276   3.456272
    bg2cost4 |        568   -1.11e-08           1   -3.07254   2.769688
-------------+---------------------------------------------------------
    bg2cost5 |        568    3.34e-10           1  -3.487679   3.428148
    bg2cost6 |        568    7.86e-09           1  -2.864862   3.011781

. gen id = _n

.
.
. ******************
. * Sum scores
. ******************
.
. gen  sum_score1 = bg2cost1 + bg2cost2 + bg2cost3 + bg2cost4 + bg2cost5 + bg2cost6

. egen sum_score2 = rowtotal( bg2cost1 bg2cost2 bg2cost3 bg2cost4 bg2cost5 bg2cost6)

.
. sum sum_score1 sum_score2

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
  sum_score1 |        568    7.00e-09    2.870774  -9.535022   7.824343
  sum_score2 |        568    1.83e-08    2.870774  -9.535022   7.824343
```

```
.
. ****************
. * factor score
. ******************
.
. factor bg2cost1-bg2cost6
(obs=568)

Factor analysis/correlation                       Number of obs    =        568
    Method: principal factors                     Retained factors =          3
    Rotation: (unrotated)                         Number of params =         15

    --------------------------------------------------------------------------
         Factor  |   Eigenvalue   Difference        Proportion   Cumulative
    -------------+------------------------------------------------------------
        Factor1  |      0.85389      0.31282            1.0310       1.0310
        Factor2  |      0.54107      0.51786            0.6533       1.6844
        Factor3  |      0.02321      0.17288            0.0280       1.7124
        Factor4  |     -0.14967      0.03951           -0.1807       1.5317
        Factor5  |     -0.18918      0.06197           -0.2284       1.3033
        Factor6  |     -0.25115            .           -0.3033       1.0000
    --------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(15) =  269.07 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    -------------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3 |   Uniqueness
    -------------+------------------------------+--------------
        bg2cost1 |   0.2470    0.3670   -0.0446 |      0.8023
        bg2cost2 |  -0.3374    0.3321   -0.0772 |      0.7699
        bg2cost3 |  -0.3764    0.3756    0.0204 |      0.7169
        bg2cost4 |  -0.3221    0.1942    0.1034 |      0.8479
        bg2cost5 |   0.4550    0.2479    0.0641 |      0.7274
        bg2cost6 |   0.4760    0.2364   -0.0068 |      0.7175
    -------------------------------------------------------------

. predict fact1 fact2
(regression scoring assumed)

Scoring coefficients (method = regression)

    ------------------------------------------
        Variable |  Factor1   Factor2   Factor3
    -------------+----------------------------
        bg2cost1 |  0.13604   0.24925  -0.04920
        bg2cost2 | -0.19316   0.23654  -0.08679
        bg2cost3 | -0.22777   0.27876   0.02509
        bg2cost4 | -0.17501   0.12900   0.11011
        bg2cost5 |  0.27242   0.18270   0.07471
        bg2cost6 |  0.28621   0.17438  -0.00963
    ------------------------------------------


.
. ******************************
. * principal component scores
. ******************************
. pca bg2cost1- bg2cost6

Principal components/correlation                  Number of obs    =        568
                                                  Number of comp.  =          6
                                                  Trace            =          6
    Rotation: (unrotated = principal)             Rho              =     1.0000

    --------------------------------------------------------------------------
       Component |   Eigenvalue   Difference         Proportion   Cumulative
    -------------+------------------------------------------------------------
            Comp1 |      1.70622      .303339             0.2844       0.2844
            Comp2 |      1.40288      .494225             0.2338       0.5182
            Comp3 |      .908652      .185673             0.1514       0.6696
```

```
        Comp4 |      .722979     .0560588             0.1205       0.7901
        Comp5 |       .66692      .074563             0.1112       0.9013
        Comp6 |      .592357            .             0.0987       1.0000
    ------------------------------------------------------------------------------

Principal components (eigenvectors)

    ------------------------------------------------------------------------------------------
        Variable |    Comp1     Comp2     Comp3     Comp4     Comp5     Comp6 | Unexplained
    -------------+----------------------------------------------------------+-------------
        bg2cost1 |   0.2741    0.5302   -0.2712   -0.7468   -0.0104   -0.1111 |           0
        bg2cost2 |  -0.3713    0.4428   -0.4974    0.2800    0.2996    0.5005 |           0
        bg2cost3 |  -0.4077    0.4834    0.0656    0.2466   -0.5649   -0.4646 |           0
        bg2cost4 |  -0.3766    0.2748    0.7266   -0.2213    0.4504    0.0538 |           0
        bg2cost5 |   0.4776    0.3345    0.3829    0.1950   -0.3942    0.5657 |           0
        bg2cost6 |   0.5009    0.3192    0.0144    0.4647    0.4824   -0.4453 |           0
    ------------------------------------------------------------------------------------------

. predict pc1 pc2, score
(4 components skipped)

Scoring coefficients
    sum of squares(column-loading) = 1

    ------------------------------------------------------------------------
        Variable |    Comp1     Comp2     Comp3     Comp4     Comp5     Comp6
    -------------+----------------------------------------------------------
        bg2cost1 |   0.2741    0.5302   -0.2712   -0.7468   -0.0104   -0.1111
        bg2cost2 |  -0.3713    0.4428   -0.4974    0.2800    0.2996    0.5005
        bg2cost3 |  -0.4077    0.4834    0.0656    0.2466   -0.5649   -0.4646
        bg2cost4 |  -0.3766    0.2748    0.7266   -0.2213    0.4504    0.0538
        bg2cost5 |   0.4776    0.3345    0.3829    0.1950   -0.3942    0.5657
        bg2cost6 |   0.5009    0.3192    0.0144    0.4647    0.4824   -0.4453
    ------------------------------------------------------------------------

.
.
. **********************
. * comparison
. **********************
. list id sum_score1 sum_score2 fact1 fact2 pc1 pc2 in 1/60

     +-------------------------------------------------------------------------+
     | id   sum_sco~1   sum_sco~2       fact1       fact2         pc1         pc2 |
     |-------------------------------------------------------------------------|
  1. |  1   -3.382211   -3.382211   -1.111189   -.7325252   -2.066568   -1.452703 |
  2. |  2   -1.557332   -1.557332    .0175051   -.4894224   -.0043078   -.7896833 |
  3. |  3   -1.059031   -1.059031    .6034917   -.0262457    1.270421    .0614895 |
  4. |  4   -.9457238   -.9457238   -.0844536   -.0703058   -.0727909   -.1428491 |
  5. |  5   -2.863222   -2.863222   -.8665586   -.6070008   -1.578892   -1.141568 |
     |-------------------------------------------------------------------------|
  6. |  6    2.314144    2.314144    .7854362    .2710596    1.350766    .6804583 |
  7. |  7    2.291358    2.291358   -.6975039    .4993652   -1.325449     .888588 |
  8. |  8   -5.347404   -5.347403   -.4401048   -1.028303   -.7272953   -2.058592 |
  9. |  9   -2.646737   -2.646737   -.3352647   -.5333338   -.5751772   -1.019825 |
 10. | 10    2.039203    2.039203    2.378886    .2281443    4.327887    .4795808 |
     |-------------------------------------------------------------------------|
 11. | 11    4.867279    4.867279    .4770728    1.152944    .8894365    2.217422 |
 12. | 12   -2.916981   -2.916981   -1.165982   -.538036   -2.11274   -1.098419 |
 13. | 13    5.557725    5.557725   -.3610857    1.108776   -.7641747    2.194317 |
 14. | 14   -2.411526   -2.411526    1.126128   -.5029948    2.149322   -.8910652 |
 15. | 15    5.756985    5.756985    .4595749    1.204324    .7817369    2.267368 |
     |-------------------------------------------------------------------------|
 16. | 16    1.759363    1.759363    .3620652    .3976434    .6322998    .6181772 |
 17. | 17     .883996    .8839959   -.5177856    .0266866   -1.013747    .2653939 |
 18. | 18    -5.67126    -5.67126   -.0853184   -1.127418   -.0717746   -2.273351 |
 19. | 19    2.671485    2.671485   -.2854307    .7780843   -.4392626    1.528009 |
 20. | 20   -4.928586   -4.928586    .9023786   -1.323612    1.628292   -2.405225 |
     |-------------------------------------------------------------------------|
 21. | 21   -2.203109   -2.203109   -1.206787   -.5053025   -2.252548   -.935748 |
 22. | 22    1.713809    1.713809   -.3627121    .3154723   -.7165511    .6700991 |
```

```
 23. | 23   -1.545179   -1.545179    -.145514   -.3366174    -.240577   -.6191071 |
 24. | 24    2.270962    2.270962   -.4720451    .5441605   -.8742896    1.041858 |
 25. | 25    5.536933    5.536933    -.128299    1.350153   -.2215305    2.526803 |
     |-------------------------------------------------------------------------------|
 26. | 26    2.078606    2.078606     .647631    .6007887    1.278903    1.170077 |
 27. | 27    .1570076    .1570076    .7000066   -.0049635    1.281552    .0126518 |
 28. | 28   -6.393401   -6.393401    .4297299   -1.295946    .9341902   -2.484573 |
 29. | 29    1.147705    1.147705    .7605511    .1144906    1.379187    .3527275 |
 30. | 30   -.1345026   -.1345023    .8467473   -.3732567    1.416286   -.6472248 |
     |-------------------------------------------------------------------------------|
 31. | 31   -5.395424   -5.395424     1.12045   -1.170292    2.156348     -2.2215 |
 32. | 32    3.938006    3.938006     -.53518    .9008164   -1.002877    1.774059 |
 33. | 33    4.162889    4.162889   -.6739647    1.076287   -1.235878    1.920997 |
 34. | 34    3.245927    3.245926    .4374356    .7955343    .8486927    1.585046 |
 35. | 35   -.5039764   -.5039763   -.8892168   -.0959498   -1.679798   -.3307997 |
     |-------------------------------------------------------------------------------|
 36. | 36    -5.12208   -5.122081    -.969615   -.9854311   -1.711102   -1.962872 |
 37. | 37   -5.936293   -5.936293    1.522925   -1.329018    2.884063   -2.474519 |
 38. | 38   -.0460284   -.0460284    .4857522    .0001954     .892297   -.0737454 |
 39. | 39    .2566707    .2566707   -.2466313    .1641071   -.4319246    .1886348 |
 40. | 40    4.954409    4.954409     .107015    .9130174     .045445    1.654201 |
     |-------------------------------------------------------------------------------|
 41. | 41   -1.634985   -1.634985    1.222769     -.43163    2.273097   -.8626325 |
 42. | 42    3.036694    3.036694   -.1782545    .7463282   -.3349725     1.32236 |
 43. | 43   -3.445662   -3.445662    .4176954   -.8195347    .7943804   -1.495219 |
 44. | 44   -1.868354   -1.868354     .252116   -.6977342    .3522045    -1.25276 |
 45. | 45    3.067819    3.067819    .3490545    .6831735    .6339435    1.296686 |
     |-------------------------------------------------------------------------------|
 46. | 46   -4.322092   -4.322092    .1630202   -1.060791    .3046204   -2.018518 |
 47. | 47    -1.80189   -1.801891   -.0036788   -.3458928    .0414921   -.6764411 |
 48. | 48   -4.388545   -4.388545   -.5371991   -.8515508   -.8989856   -1.663278 |
 49. | 49   -2.908677   -2.908677    .1847514   -.7262207    .3050508   -1.410949 |
 50. | 50   -.8328524   -.8328522    .5652358   -.4739474    .9097129   -.9274535 |
     |-------------------------------------------------------------------------------|
 51. | 51   -1.566716   -1.566716    .4977336   -.2546566    1.003164   -.4988904 |
 52. | 52   -5.682514   -5.682514   -1.121617   -1.052002    -1.95013   -2.075477 |
 53. | 53   -.7231642   -.7231643   -.8208652    .1914127   -1.358137    .3843354 |
 54. | 54    -1.82345    -1.82345    .2118987   -.2635241    .4935652    -.487772 |
 55. | 55     -3.5265     -3.5265    .2835645   -.6962313     .611844   -1.245687 |
     |-------------------------------------------------------------------------------|
 56. | 56    7.824343    7.824343    .1972177    1.632335    .2616784    3.103784 |
 57. | 57   -1.035268   -1.035268   -.4430902   -.3237608    -.855437   -.5700377 |
 58. | 58   -3.484411   -3.484411   -1.184645   -.7619094   -2.194742   -1.513544 |
 59. | 59     3.10104     3.10104   -.4934675    .6430344   -1.005457      1.0471 |
 60. | 60    1.322601    1.322601   -1.401574    .2367998   -2.637699     .478591 |
     +-------------------------------------------------------------------------------+

.
.
.
. ************************************************************
. * Read in the data in which some variables have missing values
. ************************************************************
.
. webuse bg2, clear
(Physician-cost data)

. gen id = _n

.
. *********************************************
. * generate some missing values in the data
. *********************************************
. replace bg2cost1 =. in 1/30
(30 real changes made, 30 to missing)

. replace bg2cost2 =. in 11/40
(30 real changes made, 30 to missing)

. replace bg2cost3 =. in 21/50
(30 real changes made, 30 to missing)
```

```
.
. sum

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
      clinid |        568       284.5    164.1118          1        568
    bg2cost1 |        538   -.0135311    .9875681  -3.097306   3.057153
    bg2cost2 |        538    .0035588    .9990062  -3.651067   3.157189
    bg2cost3 |        538    .0015181    .9853498  -2.757278   3.456272
    bg2cost4 |        568   -1.11e-08           1   -3.07254   2.769688
-------------+---------------------------------------------------------
    bg2cost5 |        568    3.34e-10           1  -3.487679   3.428148
    bg2cost6 |        568    7.86e-09           1  -2.864862   3.011781
          id |        568       284.5    164.1118          1        568

. list bg2cost* in 1/60

     +-------------------------------------------------------------------------+
     |  bg2cost1    bg2cost2    bg2cost3    bg2cost4    bg2cost5    bg2cost6 |
     |-------------------------------------------------------------------------|
  1. |         .    .9380358   -.2946705    .3302429   -1.427679   -1.012556 |
  2. |         .    -.575019   -1.503126    1.150729   -.0272486   -.9664596 |
  3. |         .   -.3559501   -.5612639   -1.680151   -.2462112   -.4184681 |
  4. |         .   -.3932109    .5441247   -.7309039   -.4729931   -.3337976 |
  5. |         .   -.2237654   -.0054742    .6152834   -1.508267   -1.036314 |
     |-------------------------------------------------------------------------|
  6. |         .    .0330197   -1.721773    1.190844    .7750331    .7978592 |
  7. |         .   -.0564699    1.791707    1.128447   -1.454996    1.155199 |
  8. |         .    .2165199   -.3721603   -1.567863   -1.463518   -.4319263 |
  9. |         .   -.4986563   -.0404851   -.1679177   -1.271362   -.2193075 |
 10. |         .    -1.58836   -1.589452   -.8730448    3.428148    1.739625 |
     |-------------------------------------------------------------------------|
 11. |         .           .     .462442   -.5845164    1.578306    .2869261 |
 12. |         .           .    .8786037    .2207012   -1.315242   -1.362213 |
 13. |         .           .    .7809693    2.077918    .3878856    .1810187 |
 14. |         .           .   -1.718966    -1.66821    .3616255    .4685093 |
 15. |         .           .    1.379695     .675099    1.519381      1.1903 |
     |-------------------------------------------------------------------------|
 16. |         .           .    .5413964   -.9194571    .9763466    1.222369 |
 17. |         .           .   -.7090777    2.558148   -1.409543   -.4653128 |
 18. |         .           .   -.1445088    -1.68269   -.8093838   -.3184147 |
 19. |         .           .    1.374425   -.1592701   -.1095593   -.6482605 |
 20. |         .           .   -2.757278    .2153133    -.401046     .511791 |
     |-------------------------------------------------------------------------|
 21. |         .           .           .     1.12258   -1.544712    -1.30308 |
 22. |         .           .           .    1.026395   -1.053672    .5441027 |
 23. |         .           .           .    .3000827   -.9730096    .0043188 |
 24. |         .           .           .    .6086388   -.5693358    .1235579 |
 25. |         .           .           .   -.1164825   -.4450482    1.586268 |
     |-------------------------------------------------------------------------|
 26. |         .           .           .   -1.141821    1.079242    .0102792 |
 27. |         .           .           .   -.6702886    1.316908    .0384317 |
 28. |         .           .           .     -1.5154   -1.505056    .1430726 |
 29. |         .           .           .    .8437433    .6827925    .3135635 |
 30. |         .           .           .    1.288877    .8776175    1.162217 |
     |-------------------------------------------------------------------------|
 31. | -.4176063           .           .   -1.933402   -.3867561    .7809822 |
 32. |  1.377805           .           .    1.123812    .1348856   -.5736524 |
 33. |  .0947625           .           .   -.0862795    .3097938    .0850582 |
 34. |  2.006825           .           .   -.2834929    1.505028   -.5800973 |
 35. | -1.911703           .           .    .4490094   -.0048157   -.6647462 |
     |-------------------------------------------------------------------------|
 36. | -1.679403           .           .    -.470735   -.1234622    -2.76411 |
 37. | -.3280393           .           .    -2.48174    .2935544    .5878049 |
 38. | -.5895129           .           .   -1.107553   -.0929852    1.512097 |
 39. | -.7781348           .           .   -.7636514   -.0920661     .320507 |
 40. |  -.651305           .           .    1.197291    1.292533    1.428671 |
     |-------------------------------------------------------------------------|
 41. | -.2848081   -2.374438           .   -.8826279    .5772233    1.544831 |
 42. | -.0016711    .662244            .   -.1911826    .1587842     .820594 |
```

43.	-.1415637	-1.226464	.	-.2233619	-.2739681	-.241944
44.	-.9190744	-1.092324	.	1.529741	.5287955	-.2849789
45.	.8604055	-.0006734	.	.0376093	1.414919	.0488354
46.	-1.06437	-2.731533	.	.5134915	-.0490388	-.6658299
47.	-.1673623	-1.056556	.	-.310556	-.1135621	-.4736667
48.	-.7865378	-1.666106	.	-.3013634	-1.072929	-1.245968
49.	-1.448965	.4331661	.	-.4968865	-.3578142	.4661341
50.	-1.545639	-1.212351	.	1.04808	1.112536	.7160572
51.	.4041215	-1.592756	.3726606	-.9601787	.5805346	-.3710976
52.	-1.326135	-.7643498	.7438972	-.6243684	-2.435905	-1.275653
53.	1.133725	2.285634	.2773082	-1.671528	-1.712261	-1.036043
54.	.6200784	-.7182618	.0609191	-1.101086	-.4393837	-.2457158
55.	.4780281	-.1799515	-1.450549	-1.133971	-.7134745	-.5265818
56.	1.375283	.6180547	1.704121	1.39547	1.44073	1.290684
57.	-.3373478	-.5211813	-.2001805	1.225457	-1.090315	-.1117015
58.	-1.862786	-.193873	.387723	.8061436	-.8003892	-1.821229
59.	-1.537528	.8832985	1.771518	.5874519	.508383	.8879171
60.	-.0733482	-.5978827	1.697071	2.643656	-1.003173	-1.343721

```
.
.
. ********************************************************************************
. * generate an indicator showing how many items have missing values for the respondent
. ********************************************************************************

. egen missing = rowmiss(bg2cost1 bg2cost2 bg2cost3 bg2cost4 bg2cost5 bg2cost6)

.
. list id bg2cost1 bg2cost2 bg2cost3 bg2cost4 bg2cost5 bg2cost6 missing in 1/60
```

	id	bg2cost1	bg2cost2	bg2cost3	bg2cost4	bg2cost5	bg2cost6	missing
1.	1	.	.9380358	-.2946705	.3302429	-1.427679	-1.012556	1
2.	2	.	-.575019	-1.503126	1.150729	-.0272486	-.9664596	1
3.	3	.	-.3559501	-.5612639	-1.680151	-.2462112	-.4184681	1
4.	4	.	-.3932109	.5441247	-.7309039	-.4729931	-.3337976	1
5.	5	.	-.2237654	-.0054742	.6152834	-1.508267	-1.036314	1
6.	6	.	.0330197	-1.721773	1.190844	.7750331	.7978592	1
7.	7	.	-.0564699	1.791707	1.128447	-1.454996	1.155199	1
8.	8	.	.2165199	-.3721603	-1.567863	-1.463518	-.4319263	1
9.	9	.	-.4986563	-.0404851	-.1679177	-1.271362	-.2193075	1
10.	10	.	-1.58836	-1.589452	-.8730448	3.428148	1.739625	1
11.	11	.	.	.462442	-.5845164	1.578306	.2869261	2
12.	12	.	.	.8786037	.2207012	-1.315242	-1.362213	2
13.	13	.	.	.7809693	2.077918	.3878856	.1810187	2
14.	14	.	.	-1.718966	-1.66821	.3616255	.4685093	2
15.	15	.	.	1.379695	.675099	1.519381	1.1903	2
16.	16	.	.	.5413964	-.9194571	.9763466	1.222369	2
17.	17	.	.	-.7090777	2.558148	-1.409543	-.4653128	2
18.	18	.	.	-.1445088	-1.68269	-.8093838	-.3184147	2
19.	19	.	.	1.374425	-.1592701	-.1095593	-.6482605	2
20.	20	.	.	-2.757278	.2153133	-.401046	.511791	2
21.	21	.	.	.	1.12258	-1.544712	-1.30308	3
22.	22	.	.	.	1.026395	-1.053672	.5441027	3
23.	23	.	.	.	.3000827	-.9730096	.0043188	3
24.	24	.	.	.	.6086388	-.5693358	.1235579	3
25.	25	.	.	.	-.1164825	-.4450482	1.586268	3
26.	26	.	.	.	-1.141821	1.079242	.0102792	3
27.	27	.	.	.	-.6702886	1.316908	.0384317	3
28.	28	.	.	.	-1.5154	-1.505056	.1430726	3
29.	29	.	.	.	.8437433	.6827925	.3135635	3

```
 30. | 30          .           .     1.288877    .8776175    1.162217          3 |
     |-------------------------------------------------------------------------------|
 31. | 31   -.4176063          .           .   -1.933402   -.3867561    .7809822          2 |
 32. | 32    1.377805          .           .    1.123812    .1348856   -.5736524          2 |
 33. | 33    .0947625          .           .   -.0862795    .3097938    .0850582          2 |
 34. | 34    2.006825          .           .   -.2834929    1.505028   -.5800973          2 |
 35. | 35   -1.911703          .           .    .4490094   -.0048157   -.6647462          2 |
     |-------------------------------------------------------------------------------|
 36. | 36   -1.679403          .           .    -.470735   -.1234622    -2.76411          2 |
 37. | 37   -.3280393          .           .    -2.48174    .2935544    .5878049          2 |
 38. | 38   -.5895129          .           .   -1.107553   -.0929852    1.512097          2 |
 39. | 39   -.7781348          .           .   -.7636514   -.0920661     .320507          2 |
 40. | 40    -.651305          .           .    1.197291    1.292533    1.428671          2 |
     |-------------------------------------------------------------------------------|
 41. | 41   -.2848081   -2.374438          .   -.8826279    .5772233    1.544831          1 |
 42. | 42   -.0016711     .662244          .   -.1911826    .1587842     .820594          1 |
 43. | 43   -.1415637   -1.226464          .   -.2233619   -.2739681    -.241944          1 |
 44. | 44   -.9190744   -1.092324          .    1.529741    .5287955   -.2849789          1 |
 45. | 45    .8604055   -.0006734          .    .0376093    1.414919    .0488354          1 |
     |-------------------------------------------------------------------------------|
 46. | 46    -1.06437   -2.731533          .    .5134915   -.0490388   -.6658299          1 |
 47. | 47   -.1673623   -1.056556          .    -.310556   -.1135621   -.4736667          1 |
 48. | 48   -.7865378   -1.666106          .   -.3013634   -1.072929   -1.245968          1 |
 49. | 49   -1.448965    .4331661          .   -.4968865   -.3578142    .4661341          1 |
 50. | 50   -1.545639   -1.212351          .     1.04808    1.112536    .7160572          1 |
     |-------------------------------------------------------------------------------|
 51. | 51    .4041215   -1.592756    .3726606   -.9601787    .5805346   -.3710976          0 |
 52. | 52   -1.326135   -.7643498    .7438972   -.6243684   -2.435905   -1.275653          0 |
 53. | 53    1.133725    2.285634    .2773082   -1.671528   -1.712261   -1.036043          0 |
 54. | 54    .6200784   -.7182618    .0609191   -1.101086   -.4393837   -.2457158          0 |
 55. | 55    .4780281   -.1799515   -1.450549   -1.133971   -.7134745   -.5265818          0 |
     |-------------------------------------------------------------------------------|
 56. | 56    1.375283    .6180547    1.704121     1.39547     1.44073    1.290684          0 |
 57. | 57   -.3373478   -.5211813   -.2001805    1.225457   -1.090315   -.1117015          0 |
 58. | 58   -1.862786    -.193873     .387723    .8061436   -.8003892   -1.821229          0 |
 59. | 59   -1.537528    .8832985    1.771518    .5874519     .508383    .8879171          0 |
 60. | 60   -.0733482   -.5978827    1.697071    2.643656   -1.003173   -1.343721          0 |
     +-------------------------------------------------------------------------------+

.
. ******************
. * Sum scores
. ******************
.
. gen  sum_score1 = bg2cost1 + bg2cost2 + bg2cost3 + bg2cost4 + bg2cost5 + bg2cost6
(50 missing values generated)

. egen sum_score2 = rowtotal( bg2cost1 bg2cost2 bg2cost3 bg2cost4 bg2cost5 bg2cost6)

.
. sum sum_score1 sum_score2

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
  sum_score1 |        518    .0357222    2.812599  -9.535022   7.824343
  sum_score2 |        568   -.0080077    2.772016  -9.535022   7.824343

.
. ****************
. * factor score
. *****************
.
. factor bg2cost1-bg2cost6,
(obs=518)

Factor analysis/correlation                       Number of obs    =        518
    Method: principal factors                     Retained factors =          3
    Rotation: (unrotated)                         Number of params =         15

    --------------------------------------------------------------------------
        Factor  |   Eigenvalue   Difference        Proportion   Cumulative
```

```
    -------------+------------------------------------------------------------
        Factor1  |      0.85605       0.35393           1.0574       1.0574
        Factor2  |      0.50211       0.45208           0.6202       1.6776
        Factor3  |      0.05004       0.20717           0.0618       1.7394
        Factor4  |     -0.15713       0.03197          -0.1941       1.5453
        Factor5  |     -0.18910       0.06328          -0.2336       1.3117
        Factor6  |     -0.25238             .          -0.3117       1.0000
    ------------------------------------------------------------------------------
    LR test: independent vs. saturated:  chi2(15) =  238.69 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

    ------------------------------------------------------------
        Variable |  Factor1   Factor2   Factor3 |   Uniqueness
    -------------+-----------------------------+--------------
        bg2cost1 |   0.2545    0.3499   -0.0743 |      0.8073
        bg2cost2 |  -0.3351    0.3050   -0.1184 |      0.7807
        bg2cost3 |  -0.3743    0.3681    0.0361 |      0.7231
        bg2cost4 |  -0.3363    0.1991    0.1391 |      0.8280
        bg2cost5 |   0.4466    0.2370    0.0988 |      0.7346
        bg2cost6 |   0.4758    0.2354   -0.0097 |      0.7181
    ------------------------------------------------------------

. predict fact1 fact2
(regression scoring assumed)

Scoring coefficients (method = regression)

    ---------------------------------------------
        Variable |  Factor1   Factor2   Factor3
    -------------+-------------------------------
        bg2cost1 |  0.13957   0.24371  -0.07908
        bg2cost2 | -0.18990   0.22143  -0.12797
        bg2cost3 | -0.22532   0.27978   0.04164
        bg2cost4 | -0.18486   0.13765   0.14509
        bg2cost5 |  0.26557   0.17796   0.11111
        bg2cost6 |  0.28620   0.17909  -0.01314
    ---------------------------------------------


.
.
. ******************************
. * principal component score
. ******************************
. pca bg2cost1- bg2cost6

Principal components/correlation                  Number of obs    =        518
                                                  Number of comp.  =          6
                                                  Trace            =          6
    Rotation: (unrotated = principal)             Rho              =     1.0000

    ------------------------------------------------------------------------------
       Component |   Eigenvalue   Difference         Proportion   Cumulative
    -------------+----------------------------------------------------------------
           Comp1 |      1.71243      .344109             0.2854       0.2854
           Comp2 |      1.36832      .436418             0.2281       0.5135
           Comp3 |      .931901      .212638             0.1553       0.6688
           Comp4 |      .719263     .0477692             0.1199       0.7887
           Comp5 |      .671494        .0749             0.1119       0.9006
           Comp6 |      .596594            .             0.0994       1.0000
    ------------------------------------------------------------------------------

Principal components (eigenvectors)

    ------------------------------------------------------------------------------------------------
        Variable |    Comp1     Comp2     Comp3     Comp4     Comp5     Comp6 | Unexplained
    -------------+----------------------------------------------------------------+-------------
        bg2cost1 |   0.2833    0.5272   -0.3163   -0.7324   -0.0165   -0.0719 |           0
        bg2cost2 |  -0.3696    0.4275   -0.5226    0.3373    0.2437    0.4842 |           0
        bg2cost3 |  -0.4047    0.4920    0.1223    0.2035   -0.5632   -0.4697 |           0
```

```
       bg2cost4 |  -0.3863    0.2859    0.6610   -0.2486    0.5136    0.0808 |           0
       bg2cost5 |   0.4699    0.3296    0.4183    0.1907   -0.3658    0.5704 |           0
       bg2cost6 |   0.4993    0.3270    0.0094    0.4586    0.4749   -0.4559 |           0
    ------------------------------------------------------------------------------------

. predict pc1 pc2, score
(4 components skipped)

Scoring coefficients
    sum of squares(column-loading) = 1

    ---------------------------------------------------------------------------
       Variable |    Comp1     Comp2     Comp3     Comp4     Comp5     Comp6
    ------------+--------------------------------------------------------------
       bg2cost1 |   0.2833    0.5272   -0.3163   -0.7324   -0.0165   -0.0719
       bg2cost2 |  -0.3696    0.4275   -0.5226    0.3373    0.2437    0.4842
       bg2cost3 |  -0.4047    0.4920    0.1223    0.2035   -0.5632   -0.4697
       bg2cost4 |  -0.3863    0.2859    0.6610   -0.2486    0.5136    0.0808
       bg2cost5 |   0.4699    0.3296    0.4183    0.1907   -0.3658    0.5704
       bg2cost6 |   0.4993    0.3270    0.0094    0.4586    0.4749   -0.4559
    ---------------------------------------------------------------------------

.
.
. ***********************
. * comparison
. ***********************
. list id missing sum_score1 sum_score2 fact1 fact2 pc1 pc2 in 1/60

     +-----------------------------------------------------------------------------------------+
     | id   missing   sum_sco~1   sum_sco~2       fact1       fact2         pc1          pc2 |
     |-----------------------------------------------------------------------------------------|
  1. |  1         1           .   -1.466627           .           .           .            . |
  2. |  2         1           .   -1.921124           .           .           .            . |
  3. |  3         1           .   -3.262044           .           .           .            . |
  4. |  4         1           .   -1.386781           .           .           .            . |
  5. |  5         1           .   -2.158537           .           .           .            . |
     |-----------------------------------------------------------------------------------------|
  6. |  6         1           .    1.074983           .           .           .            . |
  7. |  7         1           .    2.563888           .           .           .            . |
  8. |  8         1           .   -3.618948           .           .           .            . |
  9. |  9         1           .   -2.197728           .           .           .            . |
 10. | 10         1           .    1.116917           .           .           .            . |
     |-----------------------------------------------------------------------------------------|
 11. | 11         2           .    1.743158           .           .           .            . |
 12. | 12         2           .    -1.57815           .           .           .            . |
 13. | 13         2           .    3.427791           .           .           .            . |
 14. | 14         2           .   -2.557041           .           .           .            . |
 15. | 15         2           .    4.764476           .           .           .            . |
     |-----------------------------------------------------------------------------------------|
 16. | 16         2           .    1.820655           .           .           .            . |
 17. | 17         2           .   -.0257862           .           .           .            . |
 18. | 18         2           .   -2.954997           .           .           .            . |
 19. | 19         2           .     .457335           .           .           .            . |
 20. | 20         2           .    -2.43122           .           .           .            . |
     |-----------------------------------------------------------------------------------------|
 21. | 21         3           .   -1.725213           .           .           .            . |
 22. | 22         3           .    .5168259           .           .           .            . |
 23. | 23         3           .   -.6686081           .           .           .            . |
 24. | 24         3           .    .1628609           .           .           .            . |
 25. | 25         3           .    1.024737           .           .           .            . |
     |-----------------------------------------------------------------------------------------|
 26. | 26         3           .   -.0522993           .           .           .            . |
 27. | 27         3           .    .6850507           .           .           .            . |
 28. | 28         3           .   -2.877383           .           .           .            . |
 29. | 29         3           .    1.840099           .           .           .            . |
 30. | 30         3           .    3.328711           .           .           .            . |
     |-----------------------------------------------------------------------------------------|
 31. | 31         2           .   -1.956782           .           .           .            . |
 32. | 32         2           .     2.06285           .           .           .            . |
 33. | 33         2           .    .4033349           .           .           .            . |
```

```
 34. | 34         2           .    2.648264          .          .          .          . |
 35. | 35         2           .   -2.132256          .          .          .          . |
     |-------------------------------------------------------------------------------------|
 36. | 36         2           .    -5.03771          .          .          .          . |
 37. | 37         2           .    -1.92842          .          .          .          . |
 38. | 38         2           .   -.2779537          .          .          .          . |
 39. | 39         2           .   -1.313345          .          .          .          . |
 40. | 40         2           .     3.26719          .          .          .          . |
     |-------------------------------------------------------------------------------------|
 41. | 41         1           .    -1.41982          .          .          .          . |
 42. | 42         1           .    1.448768          .          .          .          . |
 43. | 43         1           .   -2.107302          .          .          .          . |
 44. | 44         1           .   -.2378415          .          .          .          . |
 45. | 45         1           .    2.361097          .          .          .          . |
     |-------------------------------------------------------------------------------------|
 46. | 46         1           .    -3.99728          .          .          .          . |
 47. | 47         1           .   -2.121703          .          .          .          . |
 48. | 48         1           .   -5.072905          .          .          .          . |
 49. | 49         1           .   -1.404366          .          .          .          . |
 50. | 50         1           .    .1186832          .          .          .          . |
     |-------------------------------------------------------------------------------------|
 51. | 51         0   -1.566716   -1.566716    .5141591   -.2525572    1.037288   -.5033536 |
 52. | 52         0   -5.682514   -5.682514   -1.098831   -1.042436   -1.924745   -2.080209 |
 53. | 53         0   -.7231642   -.7231643   -.7700303    .1392872   -1.291609    .3296998 |
 54. | 54         0    -1.82345    -1.82345    .2392262    -.272949    .5386155   -.5058288 |
 55. | 55         0     -3.5265     -3.5265    .3182822   -.7245647    .6683183    -1.30293 |
     |-------------------------------------------------------------------------------------|
 56. | 56         0    7.824343    7.824343    .1833138    1.638165    .2524785    3.141942 |
 57. | 57         0   -1.035268   -1.035268   -.4430864   -.3102741   -.8488586   -.5661015 |
 58. | 58         0   -3.484411   -3.484411   -1.187057    -.756036   -2.199198   -1.524334 |
 59. | 59         0     3.10104     3.10104   -.5079402    .6458236   -1.036615     1.05938 |
 60. | 60         0    1.322601    1.322601   -1.419549    .2753002    -2.65189    .5364518 |
     +-------------------------------------------------------------------------------------+

.
.
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