```
--------------------------------------------------------------------------------
      log:  d:univaranal.log
 log type:  text
opened on:  16 Feb 2007, 13:51:33

. clear

. quietly do univaranal

. set more off

. univaranaldoc

 UNIVARANAL contains 1 program -- rununivar -- that evaluates
 the probability that observed cost and effect differences are
 due to chance.  It also contains two utility programs that it
 uses to estimate or display its results (bscande and
 showresult) as well as a program called univaranaldoc, which
 provides brief documentation for rununivar

 Glick, univaranal last updated 2/16/07



 PROGRAM: RUNUNIVAR

 UNIVARIATE COST AND EFFECT DIFFERENCE TESTS

 rununivar evaluates univariate differences in continuous cost
 and effect variables.  Both cost and effect variables must be
 continuous.  The variable representing treatment must be
 dichotomous (but need not be 0/1)

 COMMAND LINE:  rununivar [COSTVAR] [EFFECTVAR] [GROUPVAR] [if]

 Arguments (the 3 arguments are all names of variables):
 `1'  Name of the cost variable
 `2'  Name of the effect variable
 `3'  Name of the treatment group (dichotomous variable)

 costvar and effectvar should both be continuous (because this
 program performs tests of continuous variables).  groupvar must
 take on one of two values (although they need not be 0/1).
 If more than 2 treatment groups exist in the dataset, use the
 [if] statement to identify the 2 groups you wish to compare
 We recommend that you open a log file before running this
 program.  The program respects your [set more] setting.  If you
 want the output of the program to scroll continuously without
 stopping, use the [set more off] command before running


 PROGRAM DESCRIPTION

 rununivar performs two-sample statistical tests on the
 difference in continuous measures of both cost and effect
 (rununivar is not designed for tests of categorical measures of
 effect [e.g., dichotomous live/die or cure/no cure variables]).
 It implements the following commands/tests for both cost and effect:

 1.   INSPECT THE COST DATA (by use of sum,detail, stratified by
      treatment group)
```

2. TEST IF THE SD'S ARE EQUAL (by use of sdtest)
3. DO T-TEST (by use of ttest; equal/unequal variances based on results of sdtest)
4. TEST FOR THE NORMALITY OF THE COST DATA (by use of sktest, stratified by treatment group)
5. DO WILCOXAN RANKSUM TEST (by use of ranksum)
6. DO KOLMOGOROV SMIRNOV TEST (by use of ksmirnov)
7. IDENTIFY TRANSFORMATION TOWARDS NORMAL (by use of ladder, stratified by treatment group)
8. INSPECT THE TRANSFORMED COST DATA (by use of sum,detail, stratified by treatment group)
9. TEST IF THE SD'S OF THE TRANSFORMED COST DATA ARE EQUAL (by use of sdtest)
10. DO T-TEST ON TRANSFORMED COST DATA (by use of ttest; equal/ unequal variances based on results of sdtest)
11. TEST FOR NORMALITY OF THE TRANSFORMED COST DATA
12. REPEAT ALL 11 STEPS FOR THE OUTCOME VARIABLE

[Note that in step 7 in which we consider transforming the data, we do not simply take the log transformation, but instead assess which of the 9 transformations evaluated by the `ladder' command makes the data most normal. As noted in the book, problems with retransformation confront most if not all of the ladder transformations.]

SAVED RESULTS

Scalars
r(cdiff)=difference in cost
r(cttestp)=p-value for parametric test of cost
r(cttll)=parametric lower 95% CL for cost
r(cttul)=parametric upper 95% CL for cost
r(cbsp)=p-value for nonparametric test of cost
r(cbsll)=bootstrap lower 95% CL for cost
r(cbsul)=bootstrap upper 95% CL for cost
r(cwrsp)=p-value for rank-sum test for cost
r(cksp)=p-value for kilmogorov smirnov test for cost
r(ctttp)=p-value for difference in transformed cost
r(chetp)=p-value hettest for cost
r(qdiff)=difference in effect
r(qttestp)=p-value for parametric test of effect
r(qttll)=parametric lower 95% CL for effect
r(qttul)=parametric upper 95% CL for effect
r(qbsp)=p-value for nonparametric test of effect
r(qbsll)=bootstrap lower 95% CL for effect
r(qbsul)=bootstrap upper 95% CL for effect
r(qwrsp)=p-value for rank-sum test for effect
r(qksp)=p-value for kilmogorov smirnov test for effect
r(qtttp)=p-value for difference in transformed effect
r(qhetp)=p-value hettest for effect

Macros
r(ctrans)=transformation of cost to normal
r(qtrans)=transformation of effect to normal

EXAMPLES

* Basic command

```
      rununivar cost qaly treat

 * Require each observation to contribute measures of
   both cost and effect

      rununivar cost qaly treat if cost~=.&qaly~=.

 * Identify 2 of multiple treatment groups

      rununivar cost qaly treat if groupvar==[#]|groupvar==[#]


 *** RESERVED SCALAR NAMES ***

 In general, running rununivar will leave your dataset
 and programming environment unchanged.  However, due
 to limitations in running the bootstrap, this program
 creates 4 scalars that will overwrite similarly named
 scalars that you may have created:

       __hgc00000 __hgc00001 __hge00000 __hge00001

 If you have created scalars with these names, running this
 program will corrupt your scalars.

 In the routine running of this program, these four scalars
 are deleted after the bootstap is run. If the program
 terminates early because of an error, these scalars may
 remain in the workspace.  They can be eliminated by:

 1.   clearing the workspace: (clear)

 2.   dropping all scalars: (scalar drop _all)

 3.   dropping the specific scalars:
       scalar drop __hgc00000 __hgc00001 __hge00000 __hge00001

 4.   ending the session


. use chapter5

. sum

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
          id |       500       250.5    144.4818          1        500
       treat |       500          .5    .5005008          0          1
        cost |       500      3027.5    1389.921        315      10499
        qaly |       500    .5941654    .2121149     .04798     .95119


. rununivar cost qaly treat

  UNIVARIATE ANALYSIS OF COST:   cost

  INSPECT THE COST DATA

------------------------------------------------------------------------------
-> treat = 0
```

```
                         Total cost
-------------------------------------------------------------
      Percentiles      Smallest
 1%          622            315
 5%          899            589
10%         1093            622       Obs                 250
25%         1819            640       Sum of Wgt.         250

50%       2825.5                      Mean               3015
                        Largest       Std. Dev.      1582.802
75%         3752           7361
90%         4952           7540       Variance        2505262
95%         6103           8232       Skewness        1.03501
99%         7540          10483       Kurtosis       4.910192

------------------------------------------------------------------------------
-> treat = 1

                         Total cost
-------------------------------------------------------------
      Percentiles      Smallest
 1%         1093            681
 5%         1426            899
10%         1832           1093       Obs                 250
25%         2226           1170       Sum of Wgt.         250

50%       2900.5                      Mean               3040
                        Largest       Std. Dev.      1168.737
75%         3604           6296
90%         4404           6470       Variance        1365946
95%         5085           6520       Skewness       1.525386
99%         6470          10499       Kurtosis       9.234913


  TEST IF THE SD'S ARE EQUAL


Variance ratio test
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |     250        3015    100.1052    1582.802    2817.839    3212.161
       1 |     250        3040    73.91742    1168.737    2894.417    3185.583
---------+--------------------------------------------------------------------
combined |     500      3027.5    62.15917    1389.921    2905.374    3149.626
------------------------------------------------------------------------------
    ratio = sd(0) / sd(1)                                         f =   1.8341
Ho: ratio = 1                                    degrees of freedom = 249, 249

    Ha: ratio < 1               Ha: ratio != 1                 Ha: ratio > 1
  Pr(F < f) = 1.0000         2*Pr(F > f) = 0.0000           Pr(F > f) = 0.0000


  DO T-TEST

Two-sample t test with unequal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |     250        3015    100.1052    1582.802    2817.839    3212.161
       1 |     250        3040    73.91742    1168.737    2894.417    3185.583
```

```
---------+--------------------------------------------------------------------
combined |     500      3027.5    62.15917    1389.921    2905.374    3149.626
---------+--------------------------------------------------------------------
    diff |                 -25    124.4381               -269.5399    219.5399
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -0.2009
Ho: diff = 0                     Satterthwaite's degrees of freedom =  458.304

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.4204         Pr(|T| > |t|) = 0.8409          Pr(T > t) = 0.5796
```

TEST FOR THE NORMALITY OF THE COST DATA

Treatment group 0

```
                   Skewness/Kurtosis tests for Normality
                                                     ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
        cost |      0.000         0.000          37.08       0.0000
```

Treatment group 1

```
                   Skewness/Kurtosis tests for Normality
                                                     ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
        cost |      0.000         0.000          73.47       0.0000
```

DO WILCOXON RANKSUM TEST & KS TEST

```
Two-sample Wilcoxon rank-sum (Mann-Whitney) test

       treat |      obs    rank sum    expected
-------------+---------------------------------
           0 |      250     61183.5       62625
           1 |      250     64066.5       62625
-------------+---------------------------------
    combined |      500      125250      125250

unadjusted variance  2609375.00
adjustment for ties       -3.51
                     ----------
adjusted variance    2609371.49

Ho: cost(treat==0) = cost(treat==1)
             z =  -0.892
    Prob > |z| =   0.3722


Two-sample Kolmogorov-Smirnov test for equality of distribution functions:

 Smaller group       D       P-value  Corrected
 ----------------------------------------------
 0:                  0.1640    0.001
 1:                 -0.0640    0.359
 Combined K-S:       0.1640    0.002      0.002
```

IDENTIFY TRANSFORMATION TOWARDS NORMAL

Treatment group 0

Transformation	formula	chi2(2)	P(chi2)
cubic	cost^3	.	0.000
square	cost^2	.	0.000
raw	cost	37.08	0.000
square-root	sqrt(cost)	1.92	0.383
log	log(cost)	13.07	0.001
reciprocal root	1/sqrt(cost)	64.92	0.000
reciprocal	1/cost	.	0.000
reciprocal square	1/(cost^2)	.	0.000
reciprocal cubic	1/(cost^3)	.	0.000

Treatment group 1

Transformation	formula	chi2(2)	P(chi2)
cubic	cost^3	.	0.000
square	cost^2	.	0.000
raw	cost	73.47	0.000
square-root	sqrt(cost)	18.65	0.000
log	log(cost)	8.70	0.013
reciprocal root	1/sqrt(cost)	46.39	0.000
reciprocal	1/cost	.	0.000
reciprocal square	1/(cost^2)	.	0.000
reciprocal cubic	1/(cost^3)	.	0.000

INSPECT THE TRANSFORMED COST DATA

-> treat = 0

sqrt(cost)

	Percentiles	Smallest		
1%	24.93993	17.74824		
5%	29.98333	24.26932		
10%	33.06052	24.93993	Obs	250
25%	42.64973	25.29822	Sum of Wgt.	250
50%	53.15541		Mean	53.02489
		Largest	Std. Dev.	14.28906
75%	61.25357	85.79627		
90%	70.37033	86.83318	Variance	204.1773
95%	78.1217	90.73037	Skewness	.1996199
99%	86.83318	102.3865	Kurtosis	3.063787

-> treat = 1

sqrt(cost)

	Percentiles	Smallest		
1%	33.06055	26.09598		
5%	37.76242	29.98333		
10%	42.80174	33.06055	Obs	250
25%	47.1805	34.20526	Sum of Wgt.	250

50%	53.8561		Mean	54.19748
		Largest	Std. Dev.	10.15112
75%	60.03333	79.34734		
90%	66.36242	80.43631	Variance	103.0453
95%	71.30919	80.74651	Skewness	.5150992
99%	80.43631	102.4646	Kurtosis	4.654101

TEST IF THE SD'S OF THE TRANSFORMED COST DATA ARE EQUAL

Variance ratio test

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	250	53.02489	.9037197	14.28906	51.24498	54.8048
1	250	54.19748	.6420133	10.15112	52.93301	55.46195
combined	500	53.61119	.5543426	12.39548	52.52205	54.70032

ratio = sd(0) / sd(1)   f = 1.9814
Ho: ratio = 1   degrees of freedom = 249, 249

Ha: ratio < 1   Ha: ratio != 1   Ha: ratio > 1
Pr(F < f) = 1.0000   2*Pr(F > f) = 0.0000   Pr(F > f) = 0.0000

DO T-TEST ON TRANSFORMED COST DATA

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	250	53.02489	.9037197	14.28906	51.24498	54.8048
1	250	54.19748	.6420133	10.15112	52.93301	55.46195
combined	500	53.61119	.5543426	12.39548	52.52205	54.70032
diff		-1.172587	1.108553		-3.35118	1.006006

diff = mean(0) - mean(1)   t = -1.0578
Ho: diff = 0   Satterthwaite's degrees of freedom = 449.312

Ha: diff < 0   Ha: diff != 0   Ha: diff > 0
Pr(T < t) = 0.1454   Pr(|T| > |t|) = 0.2907   Pr(T > t) = 0.8546

TEST FOR NORMALITY OF THE TRANSFORMED COST DATA

Treatment group 0

Skewness/Kurtosis tests for Normality

Variable	Pr(Skewness)	Pr(Kurtosis)	------- joint ------ adj chi2(2)	Prob>chi2
__000017	0.189	0.671	1.92	0.3829

Treatment group 1

Skewness/Kurtosis tests for Normality

Variable	Pr(Skewness)	Pr(Kurtosis)	------- joint ------ adj chi2(2)	Prob>chi2

```
-------------+-----------------------------------------------------
    __000017 |      0.001         0.000            18.65       0.0001


  UNIVARIATE ANALYSIS OF EFFECT:   qaly

  INSPECT THE EFFECT DATA

-------------------------------------------------------------------------------
-> treat = 0

                            QALYs
-------------------------------------------------------------
      Percentiles      Smallest
 1%        .0861         .04798
 5%       .16518         .08147
10%      .268535          .0861       Obs                 250
25%       .41286         .09659       Sum of Wgt.         250

50%       .63118                      Mean           .5729359
                        Largest       Std. Dev.      .2171849
75%       .74512         .91366
90%      .834055         .93039       Variance       .0471693
95%       .86954          .9318       Skewness      -.4362192
99%       .93039         .95119       Kurtosis       2.253839

-------------------------------------------------------------------------------
-> treat = 1

                            QALYs
-------------------------------------------------------------
      Percentiles      Smallest
 1%       .15776          .1277
 5%        .2283         .12959
10%      .333105         .15776       Obs                 250
25%       .46083         .17516       Sum of Wgt.         250

50%      .655935                      Mean            .615395
                        Largest       Std. Dev.      .2051629
75%       .79328         .93561
90%      .856215         .94304       Variance       .0420918
95%       .89281         .94607       Skewness      -.4158588
99%       .94304         .94877       Kurtosis       2.172398


  TEST IF THE SD'S ARE EQUAL

Variance ratio test
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |     250    .5729359     .013736    .2171849    .5458824    .5999894
       1 |     250     .615395    .0129756    .2051629     .589839     .640951
---------+--------------------------------------------------------------------
combined |     500    .5941654    .0094861    .2121149    .5755279     .612803
------------------------------------------------------------------------------
    ratio = sd(0) / sd(1)                                         f =   1.1206
Ho: ratio = 1                                    degrees of freedom = 249, 249

    Ha: ratio < 1             Ha: ratio != 1                Ha: ratio > 1
```

Pr(F < f) = 0.8153   2*Pr(F > f) = 0.3695   Pr(F > f) = 0.1847

DO T-TEST

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	250	.5729359	.013736	.2171849	.5458824	.5999894
1	250	.615395	.0129756	.2051629	.589839	.640951
combined	500	.5941654	.0094861	.2121149	.5755279	.612803
diff		-.0424591	.0188956		-.079584	-.0053341

diff = mean(0) - mean(1)   t = -2.2470
Ho: diff = 0   degrees of freedom = 498

Ha: diff < 0   Ha: diff != 0   Ha: diff > 0
Pr(T < t) = 0.0125   Pr(|T| > |t|) = 0.0251   Pr(T > t) = 0.9875

TEST FOR THE NORMALITY OF THE EFFECT DATA

Treatment group 0

Skewness/Kurtosis tests for Normality

Variable	Pr(Skewness)	Pr(Kurtosis)	joint: adj chi2(2)	joint: Prob>chi2
qaly	0.005	0.000	17.94	0.0001

Treatment group 1

Skewness/Kurtosis tests for Normality

Variable	Pr(Skewness)	Pr(Kurtosis)	joint: adj chi2(2)	joint: Prob>chi2
qaly	0.008	0.000	22.14	0.0000

DO WILCOXON RANKSUM TEST & KS TEST

Two-sample Wilcoxon rank-sum (Mann-Whitney) test

treat	obs	rank sum	expected
0	250	59181	62625
1	250	66069	62625
combined	500	125250	125250

unadjusted variance 2609375.00
adjustment for ties   -0.38
adjusted variance   2609374.62

Ho: qaly(treat==0) = qaly(treat==1)
z = -2.132
Prob > |z| = 0.0330

Two-sample Kolmogorov-Smirnov test for equality of distribution functions:

Smaller group	D	P-value	Corrected
0:	0.1120	0.043	
1:	-0.0040	0.996	
Combined K-S:	0.1120	0.087	0.071

IDENTIFY TRANSFORMATION TOWARDS NORMAL

Treatment group 0

Transformation	formula	chi2(2)	P(chi2)
cubic	qaly^3	17.49	0.000
square	qaly^2	46.47	0.000
raw	qaly	17.94	0.000
square-root	sqrt(qaly)	22.76	0.000
log	log(qaly)	63.01	0.000
reciprocal root	1/sqrt(qaly)	.	0.000
reciprocal	1/qaly	.	0.000
reciprocal square	1/(qaly^2)	.	0.000
reciprocal cubic	1/(qaly^3)	.	0.000

Treatment group 1

Transformation	formula	chi2(2)	P(chi2)
cubic	qaly^3	36.73	0.000
square	qaly^2	.	0.000
raw	qaly	22.14	0.000
square-root	sqrt(qaly)	17.38	0.000
log	log(qaly)	39.84	0.000
reciprocal root	1/sqrt(qaly)	.	0.000
reciprocal	1/qaly	.	0.000
reciprocal square	1/(qaly^2)	.	0.000
reciprocal cubic	1/(qaly^3)	.	0.000

INSPECT THE TRANSFORMED DATA

-> treat = 0

qaly

	Percentiles	Smallest		
1%	.0861	.04798		
5%	.16518	.08147		
10%	.268535	.0861	Obs	250
25%	.41286	.09659	Sum of Wgt.	250
50%	.63118		Mean	.5729359
		Largest	Std. Dev.	.2171849
75%	.74512	.91366		
90%	.834055	.93039	Variance	.0471693
95%	.86954	.9318	Skewness	-.4362192
99%	.93039	.95119	Kurtosis	2.253839

```
-> treat = 1

                            qaly
-------------------------------------------------------------
      Percentiles      Smallest
 1%       .15776          .1277
 5%        .2283         .12959
10%      .333105         .15776       Obs                 250
25%       .46083         .17516       Sum of Wgt.         250

50%      .655935                      Mean            .615395
                        Largest       Std. Dev.      .2051629
75%       .79328         .93561
90%      .856215         .94304       Variance       .0420918
95%       .89281         .94607       Skewness      -.4158588
99%       .94304         .94877       Kurtosis       2.172398

  TEST IF THE SD'S OF THE TRANSFORMED EFFECT DATA ARE EQUAL

Variance ratio test
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |     250    .5729359     .013736    .2171849    .5458824    .5999894
       1 |     250     .615395    .0129756    .2051629     .589839     .640951
---------+--------------------------------------------------------------------
combined |     500    .5941654    .0094861    .2121149    .5755279     .612803
------------------------------------------------------------------------------
    ratio = sd(0) / sd(1)                                         f =   1.1206
Ho: ratio = 1                                  degrees of freedom = 249, 249

    Ha: ratio < 1               Ha: ratio != 1                 Ha: ratio > 1
  Pr(F < f) = 0.8153         2*Pr(F > f) = 0.3695           Pr(F > f) = 0.1847

  DO T-TEST ON TRANSFORMED EFFECT DATA

Two-sample t test with equal variances
------------------------------------------------------------------------------
   Group |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
       0 |     250    .5729359     .013736    .2171849    .5458824    .5999894
       1 |     250     .615395    .0129756    .2051629     .589839     .640951
---------+--------------------------------------------------------------------
combined |     500    .5941654    .0094861    .2121149    .5755279     .612803
---------+--------------------------------------------------------------------
    diff |           -.0424591    .0188956                -.079584   -.0053341
------------------------------------------------------------------------------
    diff = mean(0) - mean(1)                                      t =  -2.2470
Ho: diff = 0                                   degrees of freedom =      498

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0125         Pr(|T| > |t|) = 0.0251          Pr(T > t) = 0.9875

  TEST FOR NORMALITY OF THE TRANSFORMED EFFECT DATA

  Treatment group 0

                   Skewness/Kurtosis tests for Normality
```

```
                                               ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
    __000018 |      0.005         0.000          17.94       0.0001
```

Treatment group 1

```
                    Skewness/Kurtosis tests for Normality
                                               ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
    __000018 |      0.008         0.000          22.14       0.0000
```

RUN BOOTSTRAP, 2000 iterations

(bootstrap: bscande cost qaly treat)

Summarize bootstrap replicates

```
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       cost0 |      2000    3018.494    98.70323   2649.732   3346.248
       cost1 |      2000    3042.268     75.0312   2781.556   3334.656
       cdiff |      2000    23.77417    127.0981  -388.5801   472.7639
        eff0 |      2000    .5730548    .0134217   .5291615   .6202776
        eff1 |      2000    .6151467    .0128799   .5733691   .6575605
-------------+--------------------------------------------------------
       ediff |      2000    .0420919    .0182357  -.0314032   .1012923
```

Bootstrap Results for cost

Nonparametric 2-tailed p-value for the difference in cost

.86

Nonparametric 95% CI

-218 to 275

Parametric 2-tailed p-value for the difference in cost

.8442

Parametric 95% CI

-225 to 275

Bootstrap Results for qaly

Nonparametric 2-tailed p-value for the difference in qaly

.029

Nonparametric 95% CI

.0067 to .0771

```
  Parametric 2-tailed p-value for the difference in qaly

     .0202

  Parametric 95% CI

     .0067 to .0783
```

```
------------------------------------------------------------------------

  SUMMARY TABLE                                    P-value     95% CI
------------------------------------------------------------------------

 DIFFERENCE IN ARITHMETIC MEAN COST:        25.00   SE:     124.44
 COST VARIABLE:   cost

  t-test, difference in means:                     0.8409    -220 to 270
  nonparametric BS, diff in means:                 0.8600    -218 to 275
  Wilcoxan rank-sum:                               0.3722
  Kolmogorov-Smirnov:                              0.0017
  transformation to normal                         Sqrt
  t-test, transformed variable:                    0.2907
  test for heteroscedasticity:                     0.0000


 DIFFERENCE IN ARITHMETIC MEAN EFFECT:    0.04250   SE:   0.018900
 EFFECT VARIABLE:   qaly

  t-test, difference in means:                     0.0251    .0053 to .0796
  nonparametric BS, diff in means:                 0.0290    .0067 to .0771
  Wilcoxan rank-sum:                               0.0330
  Kolmogorov-Smirnov:                              0.0710
  transformation to normal                         Raw
  t-test, transformed variable:                    0.0251
  test for heteroscedasticity:                     0.3684
------------------------------------------------------------------------
```

```
. return list

scalars:
             r(cdiff) =  25
           r(cttestp) =  .8409000000000001
             r(cttll) =  -220
             r(cttul) =  270
              r(cbsp) =  .86
             r(cbsll) =  -218
             r(cbsul) =  275
             r(cwrsp) =  .3722
              r(cksp) =  .0017
             r(ctttp) =  .2907
             r(chetp) =  0
             r(qdiff) =  .0425
           r(qttestp) =  .0251
             r(qttll) =  .0053
             r(qttul) =  .0796
              r(qbsp) =  .029
             r(qbsll) =  .0067
             r(qbsul) =  .0771
```

```
             r(qwrsp) =  .033
              r(qksp) =  .071
             r(qtttp) =  .0251
             r(qhetp) =  .3684

macros:
            r(ctrans) : "Sqrt"
            r(qtrans) : "Raw"

. set more on

. log close
       log:  d:univaranal.log
  log type:  text
 closed on:  16 Feb 2007, 13:52:43
-------------------------------------------------------------------------------
```