WesVar Analysis Example Replication C7

WesVar 5.1 is primarily a point and click application and though a text file of commands can be used in the WesVar (V5.1) batch processing environment, all examples presented here use the GUI method. For more information on the batch processing approach, see the WesVar documentation addendum for V5.1.

Due to use of GUI method, no syntax is presented prior to results. Typically, WesVar results and setups are stored in WesVar workbooks. The analysis example replication documents include selected parts of the workbook output to highlight key results. For more on additional outputs and program features, see the WesVar documentation.

Output WesVar Analysis Example Replication C7

Note Codes for Race, Age and Marital Status are reversed to match Stata output.

Original codes are and reversed are:
Race/Ethnicity 1=Mexican-Am 2=Other Hispanic 3=NH White 4=NH Black 5= Other Race
Marital Status 1=Currently Married 2=Previously Married 3=Never Married
Gender 1=Male 2=Female
Reversed Codes are simply the reversed of original.

Example 7.5 Bivariate Testing, Model Parameter Estimates and F Tests (Each model is run as a separate bivariate linear model)

Regression Coefficients

	PARAMETER	STANDARD ERROR	TEST FOR H0:			
PARAMETER	ESTIMATE	OF ESTIMATE	PARAMETER=0	PROB>|T|	LOWER 95%	UPPER 95%
agec	0.039	0.019	2.083	0.053	-0.001	0.079
rev_race.1	1.306	0.704	1.854	0.081	-0.180	2.791
rev_race.2	2.290	0.704	3.253	0.005	0.805	3.776
rev_race.3	2.185	0.748	2.922	0.009	0.608	3.762
rev_race.4	-0.155	1.508	-0.103	0.919	-3.337	3.027
r_gender.1	-2.200	0.568	-3.874	0.001	-3.399	-1.002
r_marcat.1	-1.121	0.842	-1.331	0.201	-2.897	0.655
r_marcat.2	-0.145	0.698	-0.208	0.838	-1.618	1.328

Significance Tests

TEST	F VALUE	NUM. DF	DENOM. DF	PROB>F
agec	4.340	1	17	0.053
rev_race[5]	3.875	4	14	0.025
r_gender[2]	15.007	1	17	0.001
r_marcat[3]	0.852	2	16	0.445

Example 7.5 Naive Analysis Ignoring Sample Design Features, Not Easily Done in WesVar

Example 7.5 Weighted Regression Analysis, Not Easily Done in WesVar Regression Models

Example 7.5 Appropriate Analysis using All Sample Design Features

```
WESVAR VERSION NUMBER :      v5.1.18
TIME THE JOB EXECUTED :      14:12:04 06/30/2017
INPUT DATASET NAME :  P:\ASDA 2\Data sets\nhanes 2011_2012\c7_nhanes_r.var
TIME THE INPUT DATASET CREATED :     13:13:17 06/30/2017
FULL SAMPLE WEIGHT :  WTMEC2YR
REPLICATE WEIGHTS :   RPL01...RPL31
VARIANCE ESTIMATION METHOD : JKn
JKn FACTOR(S) :       0.67 0.67 0.67 0.67 0.67 0.67 0.67 0.67 0.67 0.50
       0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50
       0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50

TYPE OF ANALYSIS :    LINEAR
VALUE OF ALPHA (CONFIDENCE LEVEL %) :       0.05000 (95.00000 %)
OPTION OUTPUT REPLICATE COEFFICIENTS :      OFF
OPTION OUTPUT ITERATION HISTORY :    OFF

MODEL(S):     bpxdi1_1 = r_gender[2]  agec  rev_race[5]

NUMBER OF REPLICATES :       31
NUMBER OF OBSERVATIONS READ :       9756
WEIGHTED NUMBER OF OBSERVATIONS READ :      306590680.995

MODEL :       bpxdi1_1 = r_gender[2]  agec  rev_race[5]
 Class Variable Index :
       r_gender.1 : 1
       r_gender.2 : 2
       rev_race.1 : 1
       rev_race.2 : 2
       rev_race.3 : 3
       rev_race.4 : 4
       rev_race.5 : 5
```

Model Fit

MODEL :	4.852e+08
ERROR :	2.736e+10
TOTAL :	2.785e+10
R_SQUARE VALUE :	0.017

Parameter Estimates (Note that Marital Status is removed from model.)

	PARAMETER	STANDARD ERROR	TEST FOR H0:			
PARAMETER	ESTIMATE	OF ESTIMATE	PARAMETER=0	PROB>|T|	LOWER 95%	UPPER 95%
INTERCEPT	71.149	0.519	136.980	0.000	70.053	72.245
r_gender.1	-2.291	0.549	-4.177	0.001	-3.448	-1.134
agec	0.037	0.021	1.768	0.095	-0.007	0.081
rev_race.1	1.262	0.706	1.787	0.092	-0.228	2.752
rev_race.2	2.302	0.665	3.462	0.003	0.899	3.705
rev_race.3	1.904	0.813	2.341	0.032	0.188	3.620
rev_race.4	-0.141	1.425	-0.099	0.922	-3.148	2.865

Note: Ouput residuals and predicted values are not easily produced in WesVar nor are plots based on specific models. As a result, diagnostic plots of residuals v. Predicted values are not shown here.

Example 7.5 Add Age Squared Term to Model with All Design Features Included

```
WESVAR VERSION NUMBER :      v5.1.18
TIME THE JOB EXECUTED :      14:28:54 06/30/2017
INPUT DATASET NAME :  P:\ASDA 2\Data sets\nhanes 2011_2012\c7_nhanes_r.var
TIME THE INPUT DATASET CREATED :     13:13:17 06/30/2017
FULL SAMPLE WEIGHT :  WTMEC2YR
REPLICATE WEIGHTS :   RPL01...RPL31
VARIANCE ESTIMATION METHOD : JKn
JKn FACTOR(S) :       0.67 0.67 0.67 0.67 0.67 0.67 0.67 0.67 0.67 0.50
       0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50
       0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50

TYPE OF ANALYSIS :    LINEAR
VALUE OF ALPHA (CONFIDENCE LEVEL %) :       0.05000 (95.00000 %)
OPTION OUTPUT REPLICATE COEFFICIENTS :      OFF
OPTION OUTPUT ITERATION HISTORY :    OFF

MODEL(S):     bpxdi1_1 = agec  agecsq  r_gender[2]  rev_race[5]

NUMBER OF REPLICATES :       31
NUMBER OF OBSERVATIONS READ :        9756
WEIGHTED NUMBER OF OBSERVATIONS READ :      306590680.995

MODEL :       bpxdi1_1 = agec  agecsq  r_gender[2]  rev_race[5]
 Class Variable Index :
       r_gender.1 : 1
       r_gender.2 : 2
       rev_race.1 : 1
       rev_race.2 : 2
       rev_race.3 : 3
       rev_race.4 : 4
       rev_race.5 : 5
```

Model Output

MODEL :	3.176e+09					
ERROR :	2.467e+10					
TOTAL :	2.785e+10					
R_SQUARE VALUE :	0.114					
PARAMETER	STANDARD ERROR	TEST FOR H0:				
PARAMETER	ESTIMATE	OF ESTIMATE	PARAMETER=0	PROB>|T|	LOWER 95%	UPPER 95%
INTERCEPT	74.462	0.567	131.275	0.000	73.266	75.659
agec	0.075	0.016	4.772	0.000	0.042	0.108
agecsq	-0.012	0.001	-16.226	0.000	-0.013	-0.010
r_gender.1	-2.169	0.490	-4.424	0.000	-3.204	-1.135
rev_race.1	1.410	0.686	2.055	0.056	-0.038	2.857
rev_race.2	2.511	0.736	3.411	0.003	0.958	4.064
rev_race.3	2.084	0.862	2.417	0.027	0.265	3.904
rev_race.4	0.218	1.263	0.173	0.865	-2.446	2.882
TEST	F VALUE	NUM. DF	DENOM. DF	PROB>F		
OVERALL FIT	159.833	7	11	0.000		
agec	22.772	1	17	0.000		
agecsq	263.273	1	17	0.000		
r_gender[2]	19.574	1	17	0.000		
rev_race[5]	3.170	4	14	0.047		

Example 7.5 Test of Age X Race Interactions and Age X Gender Interactions (Race Entered First and Retained, then Gender Added in Next Model)

```
WESVAR VERSION NUMBER :      v5.1.18
TIME THE JOB EXECUTED :      14:52:06 06/30/2017
INPUT DATASET NAME :  P:\ASDA 2\Data sets\nhanes 2011_2012\c7_nhanes_r.var
TIME THE INPUT DATASET CREATED :     13:13:17 06/30/2017
FULL SAMPLE WEIGHT :  WTMEC2YR
REPLICATE WEIGHTS :   RPL01...RPL31
VARIANCE ESTIMATION METHOD : JKn
JKn FACTOR(S) :       0.67 0.67 0.67 0.67 0.67 0.67 0.67 0.67 0.67 0.50
       0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50
       0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50

TYPE OF ANALYSIS :    LINEAR
VALUE OF ALPHA (CONFIDENCE LEVEL %) :       0.05000 (95.00000 %)
OPTION OUTPUT REPLICATE COEFFICIENTS :      OFF
OPTION OUTPUT ITERATION HISTORY :    OFF

MODEL(S):     bpxdi1_1 = agec agecsq r_gender[2] rev_race[5] agec * rev_race[5] agecsq * rev_race[5]

NUMBER OF REPLICATES :       31
NUMBER OF OBSERVATIONS READ :       9756
WEIGHTED NUMBER OF OBSERVATIONS READ :      306590680.995

MODEL :       bpxdi1_1 = agec agecsq r_gender[2] rev_race[5] agec * rev_race[5] agecsq * rev_race[5]
 Class Variable Index :
       r_gender.1 : 1
       r_gender.2 : 2
       rev_race.1 : 1
       rev_race.2 : 2
       rev_race.3 : 3
       rev_race.4 : 4
       rev_race.5 : 5
```

Model Output

TEST	F VALUE	NUM. DF	DENOM. DF	PROB>F
OVERALL FIT	180.135	15	3	0.001
agec	37.826	1	17	0.000
agecsq	255.606	1	17	0.000
r_gender[2]	19.515	1	17	0.000
rev_race[5]	3.897	4	14	0.025
agec*rev_race[5]	2.802	4	14	0.067
agecsq*rev_race[5]	5.664	4	14	0.006
Test of Age*Race	6.199	8	10	0.005

Example 7.5 Final Model with Main Effects and Age X Race and Gender Interactions

```
WESVAR VERSION NUMBER :      v5.1.18
TIME THE JOB EXECUTED :      08:25:12 07/01/2017
INPUT DATASET NAME :  P:\ASDA 2\Data sets\nhanes 2011_2012\c7_nhanes_r.var
TIME THE INPUT DATASET CREATED :     13:13:17 06/30/2017
FULL SAMPLE WEIGHT :  WTMEC2YR
REPLICATE WEIGHTS :   RPL01...RPL31
VARIANCE ESTIMATION METHOD : JKn
JKn FACTOR(S) :       0.67 0.67 0.67 0.67 0.67 0.67 0.67 0.67 0.67 0.50
       0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50
       0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50

TYPE OF ANALYSIS :    LINEAR
VALUE OF ALPHA (CONFIDENCE LEVEL %) :       0.05000 (95.00000 %)
OPTION OUTPUT REPLICATE COEFFICIENTS :      OFF
OPTION OUTPUT ITERATION HISTORY :    OFF

MODEL(S):     bpxdi1_1 =

       bpxdi1_1 = agec  agecsq  r_gender[2]  rev_race[5]  agec* r_gender[2]  agecsq * r_gender[2]  agec * rev_race[5]  agecsq * rev_race[5]

NUMBER OF REPLICATES :       31
NUMBER OF OBSERVATIONS READ :       9756
WEIGHTED NUMBER OF OBSERVATIONS READ :      306590680.995


MODEL :       bpxdi1_1 = agec  agecsq  r_gender[2]  rev_race[5]  agec* r_gender[2]  agecsq * r_gender[2]  agec * rev_race[5]  agecsq * rev_race[5]
 Class Variable Index :
       r_gender.1 : 1
       r_gender.2 : 2
       rev_race.1 : 1
       rev_race.2 : 2
       rev_race.3 : 3
       rev_race.4 : 4
       rev_race.5 : 5
```

```
 OPTIONS :      Intercept,
        No Standardized Coefficient,
        Degrees of Freedom = 17
        t VALUE : 2.110
  TEST(S) :     TEST1 :  agec*r_gender.1=0, agecsq*r_gender.1=0, agec*rev_race.1=0,agec*rev_race.2=0, agec*rev_race.3=0, agec*rev_race.4=0,
agecsq*rev_race.1=0, agecsq*rev_race.2=0, agecsq*rev_race.3=0, agecsq*rev_race.4=0
        Age X Gender :  agec*r_gender.1=0,  agecsq*r_gender.1=0
 BY :    age18p = 0
 MISSING :      2328         (UNWEIGHTED)
        36827543.920597 (WEIGHTED)
 NONMISSING :   1564         (UNWEIGHTED)
        37760598.029429 (WEIGHTED)

 BY :    age18p = 1
 MISSING :      752          (UNWEIGHTED)
        19254624.698878 (WEIGHTED)
 NONMISSING :   5112         (UNWEIGHTED)
        212747914.346476 (WEIGHTED)
```

Model Output

MODEL :	3.351e+09					
ERROR :	2.450e+10					
TOTAL :	2.785e+10					
R_SQUARE VALUE :	0.120					
	PARAMETER	STANDARD ERROR	TEST FOR HO:			
PARAMETER	ESTIMATE	OF ESTIMATE	PARAMETER=0	PROB>|T|	LOWER 95%	UPPER 95%
INTERCEPT	75.346	0.828	90.990	0.000	73.599	77.094
agec	0.039	0.043	0.919	0.371	-0.051	0.129
agecsq	-0.015	0.002	-7.845	0.000	-0.019	-0.011
r_gender.1	-3.195	0.762	-4.192	0.001	-4.803	-1.587
rev_race.1	1.144	0.892	1.283	0.217	-0.738	3.026
rev_race.2	3.450	0.969	3.560	0.002	1.406	5.494
rev_race.3	1.461	0.923	1.583	0.132	-0.486	3.408
rev_race.4	0.271	0.956	0.284	0.780	-1.746	2.289
agec*r_gender.1	0.045	0.023	1.950	0.068	-0.004	0.095
agecsq*r_gender.1	0.003	0.002	2.033	0.058	-0.000	0.007
agec*rev_race.1	0.015	0.052	0.287	0.777	-0.095	0.124
agec*rev_race.2	0.035	0.042	0.828	0.419	-0.053	0.123
agec*rev_race.3	-0.004	0.056	-0.080	0.937	-0.123	0.114
agec*rev_race.4	0.050	0.055	0.906	0.378	-0.066	0.165
agecsq*rev_race.1	0.001	0.003	0.466	0.647	-0.005	0.008
agecsq*rev_race.2	-0.002	0.002	-1.125	0.276	-0.007	0.002
agecsq*rev_race.3	0.003	0.002	1.436	0.169	-0.001	0.007
agecsq*rev_race.4	0.001	0.004	0.229	0.821	-0.007	0.009
TEST	F VALUE	NUM. DF	DENOM. DF	PROB>F		
OVERALL FIT	75.544	17	1	0.090		
agec	32.758	1	17	0.000		
agecsq	252.795	1	17	0.000		
r_gender[2]	17.575	1	17	0.001		
rev_race[5]	4.169	4	14	0.020		
agec*r_gender[2]	3.804	1	17	0.068		
agecsq*r_gender[2]	4.132	1	17	0.058		
agec*rev_race[5]	2.214	4	14	0.120		
agecsq*rev_race[5]	5.226	4	14	0.009		
Age X Race	5.705	10	8	0.011		
Age X Gender	4.875	2	16	0.022		

NOTE: No additional regression diagnostics available from WesVar, could be done using other software such as Stata or SAS.

Example 7.5 Q Weighted Model Using Pfefferman Method (Data set prepared using SAS)

```
WESVAR VERSION NUMBER :      v5.1.18
TIME THE JOB EXECUTED :      11:05:15 07/01/2017
INPUT DATASET NAME :  P:\ASDA 2\Data sets\nhanes 2011_2012\c7_nhanes_q_r.var
TIME THE INPUT DATASET CREATED :     11:01:27 07/01/2017
FULL SAMPLE WEIGHT :  q_wtmec2yr
REPLICATE WEIGHTS :   RPL01...RPL31
VARIANCE ESTIMATION METHOD : JKn
JKn FACTOR(S) :       0.67 0.67 0.67 0.67 0.67 0.67 0.67 0.67 0.67 0.50
       0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50
       0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50

TYPE OF ANALYSIS :    LINEAR
VALUE OF ALPHA (CONFIDENCE LEVEL %) :       0.05000 (95.00000 %)
OPTION OUTPUT REPLICATE COEFFICIENTS :      OFF
OPTION OUTPUT ITERATION HISTORY :    OFF

MODEL(S):     bpxdi1_1 = agecsq  agec  r_gender[2]  r_ridreth1[5]  agec*r_gender[2]  agecsq*r_gender[2]  agec*r_ridreth1[5]  agecsq*r_ridreth1[5]

NUMBER OF REPLICATES :       31
NUMBER OF OBSERVATIONS READ :       9756
WEIGHTED NUMBER OF OBSERVATIONS READ :      9807.001

MODEL :       bpxdi1_1 = agecsq  agec  r_gender[2]  r_ridreth1[5]  agec*r_gender[2]  agecsq*r_gender[2]  agec*r_ridreth1[5]  agecsq*r_ridreth1[5]
 Class Variable Index :
       r_gender.1 : 1
       r_gender.2 : 2
       r_ridreth1.1 : 1
       r_ridreth1.2 : 2
       r_ridreth1.3 : 3
       r_ridreth1.4 : 4
       r_ridreth1.5 : 5
```

Model Output

MODEL :	119442.196					
ERROR :	706589.857					
TOTAL :	826032.053					
R_SQUARE VALUE :	0.145					
	PARAMETER	STANDARD ERROR	TEST FOR H0:			
PARAMETER	ESTIMATE	OF ESTIMATE	PARAMETER=0	PROB>|T|	LOWER 95%	UPPER 95%
INTERCEPT	75.413	0.780	96.624	0.000	73.767	77.060
agecsq	-0.015	0.002	-8.390	0.000	-0.019	-0.011
agec	0.047	0.043	1.094	0.289	-0.043	0.137
r_gender.1	-3.429	0.634	-5.406	0.000	-4.767	-2.091
r_ridreth1.1	1.238	0.888	1.394	0.181	-0.635	3.111
r_ridreth1.2	3.566	0.997	3.578	0.002	1.463	5.669
r_ridreth1.3	1.501	0.904	1.659	0.115	-0.407	3.409
r_ridreth1.4	0.248	0.992	0.250	0.806	-1.846	2.341
agec*r_gender.1	0.034	0.026	1.301	0.210	-0.021	0.090
agecsq*r_gender.1	0.003	0.002	1.768	0.095	-0.001	0.006
agec*r_ridreth1.1	0.013	0.049	0.260	0.798	-0.090	0.115
agec*r_ridreth1.2	0.036	0.040	0.910	0.375	-0.047	0.119
agec*r_ridreth1.3	-0.006	0.054	-0.103	0.919	-0.119	0.108
agec*r_ridreth1.4	0.048	0.052	0.925	0.368	-0.062	0.158
agecsq*r_ridreth1.1	0.001	0.003	0.396	0.697	-0.005	0.008
agecsq*r_ridreth1.2	-0.003	0.002	-1.314	0.206	-0.007	0.002
agecsq*r_ridreth1.3	0.003	0.002	1.398	0.180	-0.001	0.006
agecsq*r_ridreth1.4	0.001	0.004	0.294	0.772	-0.006	0.008
TEST	F VALUE	NUM. DF	DENOM. DF	PROB>F		
OVERALL FIT	80.730	17	1	0.087		
agecsq	279.310	1	17	0.000		
agec	35.752	1	17	0.000		
r_gender[2]	29.230	1	17	0.000		
r_ridreth1[5]	4.401	4	14	0.016		
agec*r_gender[2]	1.694	1	17	0.210		
agecsq*r_gender[2]	3.127	1	17	0.095		
agec*r_ridreth1[5]	2.606	4	14	0.081		
agecsq*r_ridreth1[5]	5.370	4	14	0.008		