

```

* Principal Component Analysis and Factor Analysis in Stata
* Copyright 2013 by Ani Katchova

clear all
set more off

use C:\Econometrics\Data\pca_gsp

global xlist Ag Mining Constr Manuf Manuf_nd Transp Comm Energy TradeW TradeR RE
Services Govt
global id State
global ncomp 3

describe $xlist
summarize $xlist
corr $xlist

* Principal component analysis (PCA)
pca $xlist

* Scree plot of the eigenvalues
screeplot
screeplot, yline(1)

* Principal component analysis
pca $xlist, mineigen(1)
pca $xlist, comp($ncomp)
pca $xlist, comp($ncomp) blanks(.3)

* Component rotations
rotate, varimax
rotate, varimax blanks(.3)
rotate, clear

rotate, promax
rotate, promax blanks(.3)
rotate, clear

* Scatter plots of the loadings and score variables
loadingplot
scoreplot
scoreplot, mlabel($id)

* Loadings/scores of the components
estat loadings
predict pc1 pc2 pc3, score

* KMO measure of sampling adequacy
estat kmo

* Factor analysis
factor $xlist

* Scree plot of the eigenvalues

```

```
screepplot
screepplot, yline(1)

* Factor analysis
factor $xlist, mineigen(1)
factor $xlist, factor($ncomp)
factor $xlist, factor($ncomp) blanks(0.3)

* Factor rotations
rotate, varimax
rotate, varimax blanks(.3)
rotate, clear

rotate, promax
rotate, promax blanks(.3)
rotate, clear

estat common

* Scatter plots of the loadings and score variables
loadingplot
scoreplot

* Scores of the components
predict f1 f2 f3

* KMO measure of sampling adequacy
estat kmo

* Average interitem covariance
alpha $xlist
```

```

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.
. clear all

. set more off

.
. use C:\Econometrics\Data\pca_gsp

.
. global xlist Ag Mining Constr Manuf Manuf_nd Transp Comm Energy TradeW TradeR RE
Services Govt

. global id State

. global ncomp 3

.
. describe $xlist

```

variable name	storage type	display format	value label	variable label
Ag	float	%9.0g		
Mining	float	%9.0g		
Constr	float	%9.0g		
Manuf	float	%9.0g		
Manuf_nd	float	%9.0g		
Transp	float	%9.0g		
Comm	float	%9.0g		
Energy	float	%9.0g		
TradeW	float	%9.0g		
TradeR	float	%9.0g		
RE	float	%9.0g		
Services	float	%9.0g		
Govt	float	%9.0g		

```

. summarize $xlist

```

Variable	Obs	Mean	Std. Dev.	Min	Max
Ag	50	2.48	2.394552	.5	10.6
Mining	50	2.624	5.808704	0	31.6
Constr	50	4.338	.	2.9	8.4
Manuf	50	9.784	4.76391	.8	21.4
Manuf_nd	50	7.696	3.927037	1.7	16.7
Transp	50	3.476	1.66213	1.5	12.1
Comm	50	2.398	.	1.3	5.7
Energy	50	3.112	1.147071	1	7.5
TradeW	50	6.348	1.308253	2.9	9.1
TradeR	50	9.002	1.197871	6	11.5

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RE		50	17.09	5.220965	10.4	35.4
Services		50	18.712	3.728962	9.6	32.3
Govt		50	12.934	2.798003	9	21.3

```
. corr $xlist
(obs=50)
```

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```

TradeW	TradeR	Ag RE	Mining Services	Constr Govt	Manuf	Manuf_nd	Transp	Comm	Energy
		1.0000							
		-0.0645	1.0000						
		0.0850	-0.0215	1.0000					
		0.0321	-0.4237	-0.1299	1.0000				
		-0.1453	-0.1379	-0.3178	0.2037	1.0000			
		0.2792	0.6115	0.0752	-0.3569	-0.1764	1.0000		
		-0.1842	-0.1927	-0.0231	-0.3174	-0.0999	-0.0491	1.0000	
		0.0433	0.3904	0.0130	-0.0508	0.0709	-0.0557	-0.1686	1.0000
1.0000		0.2454	-0.5531	-0.0869	0.2707	0.0390	-0.2135	0.3302	-0.2671
		0.0946	-0.3960	0.4011	0.1946	-0.1208	-0.1478	0.1247	0.0295
0.1664	1.0000								
		-0.3013	-0.4063	-0.2529	-0.1821	-0.1333	-0.5035	0.1197	-0.3788
0.0405	-0.3086	1.0000							
		-0.3219	-0.4597	0.3236	-0.1590	-0.4577	-0.4217	0.3091	-0.3138
0.2391	0.2022	0.5193	1.0000						
		0.1103	0.2307	0.1810	-0.4105	-0.2371	0.4275	0.1933	0.0454
-0.3428	0.2866	-0.3506	-0.1796	1.0000					

```
. * Principal component analysis (PCA)
. pca $xlist
```

```
Principal components/correlation          Number of obs   =      50
                                           Number of comp. =      13
                                           Trace           =      13
Rotation: (unrotated = principal)        Rho              =      1.0000
```

```
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```

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.23551	.99905	0.2489	0.2489
Comp2	2.23646	.276623	0.1720	0.4209
Comp3	1.95984	.599488	0.1508	0.5717
Comp4	1.36035	.202928	0.1046	0.6763
Comp5	1.15742	.289087	0.0890	0.7654
Comp6	.868334	.143849	0.0668	0.8321
Comp7	.724486	.108706	0.0557	0.8879
Comp8	.615779	.297542	0.0474	0.9352
Comp9	.318237	.	0.0245	0.9597
Comp10	.235353	.083691	0.0181	0.9778
Comp11	.151662	.	0.0117	0.9895

```

Comp12 |      .136499      .136431      0.0105      1.0000
Comp13 |      .              .              0.0000      1.0000

```

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Comp8	Comp9	Comp10	Comp11	Comp12	Comp13	Unexplained
Ag	0.1348	-0.0075	0.3850	0.3731	-0.4109	0.2447	-	0.2772	0.1523	0.2173	0.0819	-0.2861	0.2059	0
Mining	0.4697	-0.0015	-0.2597	-0.0654	-0.0639	0.1642	-	-0.1480	-0.0977	0.1162	-0.4750	-0.2820	0.5003	0
Constr	0.0353	0.3935	0.2572	-0.3499	-0.1961	-0.0328	-	0.4986	0.3710	-0.0399	-0.1408	0.2562	0.0774	0
Manuf	-0.1834	-0.3757	0.3754	-0.1468	-0.1112	-0.1976	-	-0.5002	0.3872	0.0164	0.1380	0.0658	0.4061	0
Manuf_nd	-0.0097	-0.4588	0.0357	0.0455	0.4653	-0.2168	-	0.5921	-0.1015	-0.0437	0.1420	-0.1222	0.3382	0
Transp	0.4185	0.1470	0.0064	0.3651	-0.1426	-0.1694	-	-0.0669	-0.2640	0.1075	0.5073	0.4074	0.1445	0
Comm	-0.1519	0.3158	-0.0821	0.3430	0.5498	0.2669	-	-0.1005	0.4357	0.3829	0.0758	-0.0236	0.0735	0
Energy	0.2469	-0.1380	0.0689	-0.4161	0.2018	0.6890	-	-0.0276	-0.0387	-0.1161	0.2823	0.2864	0.0991	0
TradeW	-0.3153	-0.0283	0.2901	0.4419	0.0099	0.3527	-	-0.0210	-0.2525	-0.4546	-0.3221	0.2097	0.1117	0
TradeR	-0.0901	0.2610	0.5072	-0.2273	0.2523	-0.1428	-	-0.1004	-0.5153	0.4324	-0.1810	0.0540	0.1063	0
RE	-0.3631	0.0303	-0.4466	0.0122	-0.1731	-0.0523	-	0.1058	-0.0240	0.1695	-0.1267	0.4964	0.4507	0
Services	-0.3799	0.3839	-0.1275	-0.1827	-0.1255	0.1006	-	-0.0153	-0.2218	-0.2035	0.4582	-0.4600	0.3203	0
Govt	0.2888	0.3685	0.0854	0.0767	0.2949	-0.3062	-	-0.1209	0.1712	-0.5477	-0.0574	0.0157	0.2377	0

```

. * Scree plot of the eigenvalues
. screeplot

```

```

. screeplot, yline(1)

```

```

. * Principal component analysis
. pca $xlist, mineigen(1)

```

Principal components/correlation

```

Number of obs      =      50
Number of comp.    =       5
Trace               =      13
Rho                 =     0.7654

```

Rotation: (unrotated = principal)

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.23551	.99905	0.2489	0.2489
Comp2	2.23646	.276623	0.1720	0.4209
Comp3	1.95984	.599488	0.1508	0.5717
Comp4	1.36035	.202928	0.1046	0.6763
Comp5	1.15742	.289087	0.0890	0.7654
Comp6	.868334	.143849	0.0668	0.8321
Comp7	.724486	.108706	0.0557	0.8879
Comp8	.615779	.297542	0.0474	0.9352
Comp9	.318237	.	0.0245	0.9597
Comp10	.235353	.083691	0.0181	0.9778
Comp11	.151662	.	0.0117	0.9895
Comp12	.136499	.136431	0.0105	1.0000
Comp13	.	.	0.0000	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Unexplained
Ag	0.1348	-0.0075	0.3850	0.3731	-0.4109	.2657
Mining	0.4697	-0.0015	-0.2597	-0.0654	-0.0639	.1435
Constr	0.0353	0.3935	0.2572	-0.3499	-0.1961	.3091
Manuf	-0.1834	-0.3757	0.3754	-0.1468	-0.1112	.2556
Manuf_nd	-0.0097	-0.4588	0.0357	0.0455	0.4653	.273
Transp	0.4185	0.1470	0.0064	0.3651	-0.1426	.1801
Comm	-0.1519	0.3158	-0.0821	0.3430	0.5498	.1791
Energy	0.2469	-0.1380	0.0689	-0.4161	0.2018	.4682
TradeW	-0.3153	-0.0283	0.2901	0.4419	0.0099	.2459
TradeR	-0.0901	0.2610	0.5072	-0.2273	0.2523	.1731
RE	-0.3631	0.0303	-0.4466	0.0122	-0.1731	.1456
Services	-0.3799	0.3839	-0.1275	-0.1827	-0.1255	.108
Govt	0.2888	0.3685	0.0854	0.0767	0.2949	.3034

```
. pca $xlist, comp($ncomp)
```

```
Principal components/correlation      Number of obs   =      50
                                      Number of comp. =       3
                                      Trace            =      13
Rotation: (unrotated = principal)    Rho              =     0.5717
```

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.23551	.99905	0.2489	0.2489
Comp2	2.23646	.276623	0.1720	0.4209
Comp3	1.95984	.599488	0.1508	0.5717
Comp4	1.36035	.202928	0.1046	0.6763
Comp5	1.15742	.289087	0.0890	0.7654
Comp6	.868334	.143849	0.0668	0.8321

Component rotation matrix

```

-----
          |      Comp1      Comp2      Comp3
-----+-----
Comp1 |   -0.7480   -0.6544    0.1110
Comp2 |   -0.4635    0.6347    0.6184
Comp3 |    0.4751   -0.4111    0.7780
-----

```

. rotate, varimax blanks(.3)

```

Principal components/correlation      Number of obs   =      50
                                         Number of comp. =       3
                                         Trace           =      13
Rotation: orthogonal varimax (Kaiser off)  Rho             =    0.5717

```

```

-----
Component |      Variance  Difference      Proportion  Cumulative
-----+-----
Comp1 |      2.73296    .115461      0.2102      0.2102
Comp2 |      2.6175     .536159      0.2013      0.4116
Comp3 |      2.08134      .          0.1601      0.5717
-----

```

Rotated components (blanks are abs(loading)<.3)

```

-----
Variable |      Comp1      Comp2      Comp3 | Unexplained
-----+-----+-----
Ag |              |              | 0.3099 | .6506
Mining | -0.4740      |              |         | .154
Constr |              |              | 0.4473 | .5201
Manuf  | 0.4896       |              |         | .2993
Manuf_nd |              |              |         | .5264
Transp | -0.3781      |              |         | .385
Comm  |              | 0.3336      |         | .6891
Energy |              |              |         | .7508
TradeW | 0.3868       |              |         | .5116
TradeR |              |              | 0.5460 | .3171
RE    |              | 0.4404     -0.3691 |         | .1805
Services |              | 0.5446      |         | .1716
Govt  | -0.3463      |              | 0.3264 | .412
-----

```

Component rotation matrix

```

-----
          |      Comp1      Comp2      Comp3
-----+-----
Comp1 |   -0.7480   -0.6544    0.1110
Comp2 |   -0.4635    0.6347    0.6184
Comp3 |    0.4751   -0.4111    0.7780
-----

```

```
. rotate, clear
```

```
.
```

```
. rotate, promax
```

```
Principal components/correlation      Number of obs   =      50
                                         Number of comp. =       3
                                         Trace           =      13
Rotation: oblique promax (Kaiser off)  Rho             =     0.5717
```

Component	Variance	Proportion	Rotated comp. are correlated
Comp1	2.73696	0.2105	
Comp2	2.63864	0.2030	
Comp3	2.10983	0.1623	

```
Rotated components
```

Variable	Comp1	Comp2	Comp3	Unexplained
Ag	0.1048	0.2704	0.3308	.6506
Mining	-0.4834	0.1910	-0.1674	.154
Constr	-0.0626	-0.0967	0.4402	.5201
Manuf	0.4957	0.2793	0.0811	.2993
Manuf_nd	0.2253	0.2878	-0.2304	.5264
Transp	-0.3707	0.1897	0.1326	.385
Comm	-0.0676	-0.3290	0.0939	.6891
Energy	-0.0870	0.2779	0.0056	.7508
TradeW	0.3978	-0.0572	0.1923	.5116
TradeR	0.2188	0.0158	0.5604	.3171
RE	0.0222	-0.4629	-0.3935	.1805
Services	0.0480	-0.5413	0.0703	.1716
Govt	-0.3296	0.0065	0.3099	.412

```
Component rotation matrix
```

	Comp1	Comp2	Comp3
Comp1	-0.7412	0.6589	0.1060
Comp2	-0.4347	-0.6054	0.5647
Comp3	0.5234	0.4598	0.8331

```
. rotate, promax blanks(.3)
```

```
Principal components/correlation      Number of obs   =      50
                                         Number of comp. =       3
                                         Trace           =      13
Rotation: oblique promax (Kaiser off)  Rho             =     0.5717
```

Component	Variance	Proportion	Rotated comp. are correlated
Comp1	2.73696	0.2105	
Comp2	2.63864	0.2030	
Comp3	2.10983	0.1623	

Rotated components (blanks are abs(loading)<.3)

Variable	Comp1	Comp2	Comp3	Unexplained
Ag			0.3308	.6506
Mining	-0.4834			.154
Constr			0.4402	.5201
Manuf	0.4957			.2993
Manuf_nd				.5264
Transp	-0.3707			.385
Comm		-0.3290		.6891
Energy				.7508
TradeW	0.3978			.5116
TradeR			0.5604	.3171
RE		-0.4629	-0.3935	.1805
Services		-0.5413		.1716
Govt	-0.3296		0.3099	.412

Component rotation matrix

	Comp1	Comp2	Comp3
Comp1	-0.7412	0.6589	0.1060
Comp2	-0.4347	-0.6054	0.5647
Comp3	0.5234	0.4598	0.8331

```
. rotate, clear

.
. * Scatter plots of the loadings and score variables
. loadingplot

. scoreplot

. scoreplot, mlabel($id)

.
. * Loadings/scores of the components
. estat loadings
```

Principal component loadings (unrotated)

component normalization: sum of squares(column) = 1

```
-----
```

	Comp1	Comp2	Comp3
Ag	.1348	-.007463	.385
Mining	.4697	-.001482	-.2597
Constr	.03529	.3935	.2572
Manuf	-.1834	-.3757	.3754
Manuf_nd	-.009706	-.4588	.03569
Transp	.4185	.147	.006358
Comm	-.1519	.3158	-.08206
Energy	.2469	-.138	.06887
TradeW	-.3153	-.02831	.2901
TradeR	-.09014	.261	.5072
RE	-.3631	.03026	-.4466
Services	-.3799	.3839	-.1275
Govt	.2888	.3685	.08537

```
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```

```
. predict pc1 pc2 pc3, score
```

Scoring coefficients

```
sum of squares(column-loading) = 1
```

```
-----
```

Variable	Comp1	Comp2	Comp3
Ag	0.1348	-0.0075	0.3850
Mining	0.4697	-0.0015	-0.2597
Constr	0.0353	0.3935	0.2572
Manuf	-0.1834	-0.3757	0.3754
Manuf_nd	-0.0097	-0.4588	0.0357
Transp	0.4185	0.1470	0.0064
Comm	-0.1519	0.3158	-0.0821
Energy	0.2469	-0.1380	0.0689
TradeW	-0.3153	-0.0283	0.2901
TradeR	-0.0901	0.2610	0.5072
RE	-0.3631	0.0303	-0.4466
Services	-0.3799	0.3839	-0.1275
Govt	0.2888	0.3685	0.0854

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.
. * KMO measure of sampling adequacy
. estat kmo
```

Kaiser-Meyer-Olkin measure of sampling adequacy

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```

Variable	kmo
Ag	0.0345
Mining	0.1225
Constr	0.0412
Manuf	0.0636

Manuf_nd		0.0426
Transp		0.0996
Comm		0.0400
Energy		0.0416
TradeW		0.0697
TradeR		0.0535
RE		0.0966
Services		0.1074
Govt		0.0705
-----+-----		
Overall		0.0689

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.
. * Factor analysis
. factor $xlist
(obs=50)
```

```
Factor analysis/correlation          Number of obs   =    50
Method: principal factors            Retained factors =    12
Rotation: (unrotated)                Number of params =    78
```

Beware: solution is a Heywood case
(i.e., invalid or boundary values of uniqueness)

Factor		Eigenvalue	Difference	Proportion	Cumulative
Factor1		3.23329	1.00085	0.2497	0.2497
Factor2		2.23245	0.27587	0.1724	0.4221
Factor3		1.95658	0.60230	0.1511	0.5732
Factor4		1.35428	0.20228	0.1046	0.6777
Factor5		1.15200	0.28900	0.0890	0.7667
Factor6		0.86300	0.14192	0.0666	0.8333
Factor7		0.72107	0.10878	0.0557	0.8890
Factor8		0.61229	0.30032	0.0473	0.9363
Factor9		0.31198	0.08133	0.0241	0.9604
Factor10		0.23065	0.08167	0.0178	0.9782
Factor11		0.14897	0.01498	0.0115	0.9897
Factor12		0.13399	0.13481	0.0103	1.0001
Factor13		-0.00082	.	-0.0001	1.0000

LR test: independent vs. saturated: chi2(78) = 623.16 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

Variable		Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	
Factor7	Factor8	Factor9	Factor10	Factor11	Factor12	Uniqueness		
Ag		0.2426	-0.0133	0.5395	0.4382	-0.4402	0.2243	-
0.3709	0.2119	0.0830	0.1031	0.0338	-0.1052	0.0016		

0.2365	Mining	0.8450	-0.0010	-0.3643	-0.0763	-0.0714	0.1529	
		-0.1121	-0.0546	0.0558	-0.1815	-0.1064	0.0001	
0.3052	Constr	0.0633	0.5838	0.3604	-0.4044	-0.2113	-0.0318	
		0.3940	0.2102	-0.0160	-0.0563	0.0941	0.0112	
0.1329	Manuf	-0.3301	-0.5646	0.5227	-0.1723	-0.1226	-0.1864	
		-0.3905	0.2137	0.0100	0.0531	0.0238	0.0003	
0.0784	Manuf_nd	-0.0176	-0.6876	0.0463	0.0498	0.5035	-0.1966	
		0.4638	-0.0544	-0.0228	0.0547	-0.0441	0.0005	
0.2583	Transp	0.7525	0.2192	0.0106	0.4259	-0.1482	-0.1588	
		-0.0471	-0.1485	0.0493	0.1937	0.1511	0.0032	
0.1229	Comm	-0.2717	0.4700	-0.1106	0.3925	0.5893	0.2514	
		-0.0808	0.2415	0.1874	0.0312	-0.0093	0.0124	
0.1697	Energy	0.4431	-0.2066	0.0941	-0.4866	0.2060	0.6403	-
		-0.0250	-0.0210	-0.0562	0.1076	0.1067	0.0069	
0.2166	TradeW	-0.5660	-0.0439	0.4061	0.5138	0.0140	0.3286	
		-0.0150	-0.1364	-0.2179	-0.1271	0.0765	0.0054	
0.1200	TradeR	-0.1617	0.3863	0.7103	-0.2685	0.2690	-0.1299	-
		-0.0770	-0.2917	0.2057	-0.0692	0.0174	0.0060	
0.3072	RE	-0.6534	0.0490	-0.6253	0.0187	-0.1850	-0.0509	-
		0.0776	-0.0155	0.0830	-0.0510	0.1795	0.0002	
0.1158	Services	-0.6833	0.5759	-0.1756	-0.2113	-0.1360	0.0928	
		-0.0074	-0.1221	-0.1029	0.1781	-0.1659	0.0006	
0.3618	Govt	0.5199	0.5505	0.1229	0.0862	0.3209	-0.2835	-
		-0.1021	0.0982	-0.2609	-0.0238	0.0060	0.0012	

```

-----
.
. * Scree plot of the eigenvalues
. screeplot

. screeplot, yline(1)

.
. * Factor analysis
. factor $xlist, mineigen(1)
(obs=50)

```

```

Factor analysis/correlation          Number of obs   =      50
Method: principal factors            Retained factors =       5
Rotation: (unrotated)                Number of params =     55

```

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	3.23329	1.00085	0.2497	0.2497
Factor2	2.23245	0.27587	0.1724	0.4221
Factor3	1.95658	0.60230	0.1511	0.5732
Factor4	1.35428	0.20228	0.1046	0.6777
Factor5	1.15200	0.28900	0.0890	0.7667
Factor6	0.86300	0.14192	0.0666	0.8333
Factor7	0.72107	0.10878	0.0557	0.8890
Factor8	0.61229	0.30032	0.0473	0.9363
Factor9	0.31198	0.08133	0.0241	0.9604
Factor10	0.23065	0.08167	0.0178	0.9782

Factor11		0.14897	0.01498	0.0115	0.9897
Factor12		0.13399	0.13481	0.0103	1.0001
Factor13		-0.00082	.	-0.0001	1.0000

LR test: independent vs. saturated: chi2(78) = 623.16 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

Variable		Factor1	Factor2	Factor3	Factor4	Factor5		Uniqueness
Ag		0.2426	-0.0133	0.5395	0.4382	-0.4402		0.2641
Mining		0.8450	-0.0010	-0.3643	-0.0763	-0.0714		0.1423
Constr		0.0633	0.5838	0.3604	-0.4044	-0.2113		0.3170
Manuf		-0.3301	-0.5646	0.5227	-0.1723	-0.1226		0.2543
Manuf_nd		-0.0176	-0.6876	0.0463	0.0498	0.5035		0.2688
Transp		0.7525	0.2192	0.0106	0.4259	-0.1482		0.1822
Comm		-0.2717	0.4700	-0.1106	0.3925	0.5893		0.1917
Energy		0.4431	-0.2066	0.0941	-0.4866	0.2060		0.4729
TradeW		-0.5660	-0.0439	0.4061	0.5138	0.0140		0.2486
TradeR		-0.1617	0.3863	0.7103	-0.2685	0.2690		0.1757
RE		-0.6534	0.0490	-0.6253	0.0187	-0.1850		0.1451
Services		-0.6833	0.5759	-0.1756	-0.2113	-0.1360		0.1074
Govt		0.5199	0.5505	0.1229	0.0862	0.3209		0.3012

. factor \$xlist, factor(\$ncomp)
(obs=50)

Factor analysis/correlation	Number of obs	=	50
Method: principal factors	Retained factors	=	3
Rotation: (unrotated)	Number of params	=	36

Factor		Eigenvalue	Difference	Proportion	Cumulative
Factor1		3.23329	1.00085	0.2497	0.2497
Factor2		2.23245	0.27587	0.1724	0.4221
Factor3		1.95658	0.60230	0.1511	0.5732
Factor4		1.35428	0.20228	0.1046	0.6777
Factor5		1.15200	0.28900	0.0890	0.7667
Factor6		0.86300	0.14192	0.0666	0.8333
Factor7		0.72107	0.10878	0.0557	0.8890
Factor8		0.61229	0.30032	0.0473	0.9363
Factor9		0.31198	0.08133	0.0241	0.9604
Factor10		0.23065	0.08167	0.0178	0.9782
Factor11		0.14897	0.01498	0.0115	0.9897
Factor12		0.13399	0.13481	0.0103	1.0001
Factor13		-0.00082	.	-0.0001	1.0000

LR test: independent vs. saturated: chi2(78) = 623.16 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Factor3	Uniqueness
Ag	0.2426	-0.0133	0.5395	0.6499
Mining	0.8450	-0.0010	-0.3643	0.1532
Constr	0.0633	0.5838	0.3604	0.5252
Manuf	-0.3301	-0.5646	0.5227	0.2990
Manuf_nd	-0.0176	-0.6876	0.0463	0.5248
Transp	0.7525	0.2192	0.0106	0.3856
Comm	-0.2717	0.4700	-0.1106	0.6930
Energy	0.4431	-0.2066	0.0941	0.7521
TradeW	-0.5660	-0.0439	0.4061	0.5128
TradeR	-0.1617	0.3863	0.7103	0.3201
RE	-0.6534	0.0490	-0.6253	0.1797
Services	-0.6833	0.5759	-0.1756	0.1705
Govt	0.5199	0.5505	0.1229	0.4116

```
. factor $xlist, factor($ncomp) blanks(0.3)
(obs=50)
```

```
Factor analysis/correlation          Number of obs   =    50
Method: principal factors            Retained factors =     3
Rotation: (unrotated)                Number of params =   36
```

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	3.23329	1.00085	0.2497	0.2497
Factor2	2.23245	0.27587	0.1724	0.4221
Factor3	1.95658	0.60230	0.1511	0.5732
Factor4	1.35428	0.20228	0.1046	0.6777
Factor5	1.15200	0.28900	0.0890	0.7667
Factor6	0.86300	0.14192	0.0666	0.8333
Factor7	0.72107	0.10878	0.0557	0.8890
Factor8	0.61229	0.30032	0.0473	0.9363
Factor9	0.31198	0.08133	0.0241	0.9604
Factor10	0.23065	0.08167	0.0178	0.9782
Factor11	0.14897	0.01498	0.0115	0.9897
Factor12	0.13399	0.13481	0.0103	1.0001
Factor13	-0.00082	.	-0.0001	1.0000

```
LR test: independent vs. saturated:  chi2(78) = 623.16 Prob>chi2 = 0.0000
```

Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Factor3	Uniqueness
Ag			0.5395	0.6499
Mining	0.8450		-0.3643	0.1532
Constr		0.5838	0.3604	0.5252
Manuf	-0.3301	-0.5646	0.5227	0.2990
Manuf_nd		-0.6876		0.5248
Transp	0.7525			0.3856
Comm		0.4700		0.6930

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