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. * 771 DPD
 . use http://www.stata-press.com/data/r7/abdata.dta,clear

. xtabond2 n l.n l(0/1).(w k) yr1980-yr1984, gmm(l.n w k) iv(yr1980-yr1984) ///
 > noleveleg small

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Dynamic panel-data estimation, one-step difference GMM

Group variable: id	Number of obs	=	751
Time variable : year	Number of groups	=	140
Number of instruments = 103	Obs per group: min	=	5
F(10, 741) = 207.78	avg	=	5.36
Prob > F = 0.000	max	=	7

n	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
n						
L1.	.5847306	.0526328	11.11	0.000	.4814035	.6880576
w						
---	-.7204875	.0807712	-8.92	0.000	-.8790551	-.56192
L1.	.2072654	.0500393	4.14	0.000	.1090298	.3055011
k						
---	.3839347	.052686	7.29	0.000	.280503	.4873663
L1.	-.0766793	.0343085	-2.23	0.026	-.1440327	-.0093259
yr1980	-.0308167	.0089215	-3.45	0.001	-.0483312	-.0133023
yr1981	-.0649783	.0110817	-5.86	0.000	-.0867335	-.0432231
yr1982	-.0375605	.0158624	-2.37	0.018	-.068701	-.00642
yr1983	.0006808	.0209536	0.03	0.974	-.0404548	.0418164
yr1984	.0269716	.0271112	0.99	0.320	-.0262523	.0801955

Instruments for first differences equation

Standard

D.(yr1980 yr1981 yr1982 yr1983 yr1984)

GMM-type (missing=0, separate instruments for each period unless collapsed)

L(1/.) .(L.n w k)

Arellano-Bond test for AR(1) in first differences: z = **-7.33** Pr > z = **0.000**

Arellano-Bond test for AR(2) in first differences: z = **-0.51** Pr > z = **0.608**

Sargan test of overid. restrictions: chi2(93) = **204.53** Prob > chi2 = **0.000**

(Not robust, but not weakened by many instruments.)

Difference-in-Sargan tests of exogeneity of instrument subsets:

iv(yr1980 yr1981 yr1982 yr1983 yr1984)

Sargan test excluding group: chi2(88) = **179.89** Prob > chi2 = **0.000**

Difference (null H = exogenous): chi2(5) = **24.64** Prob > chi2 = **0.000**

```
. xtabond2 n l.n l(0/1).(w k) yr1980-yr1984, gmm(l.n w k) iv(yr1980-yr1984, mz) robust ///
> twostep small h(2)
```

Favoring speed over space. To switch, type or click on `mata: mata set matafavor space, perm.`
Warning: Two-step estimated covariance matrix of moments is singular.

**Using a generalized inverse to calculate optimal weighting matrix for two-step estimation.
Difference-in-Sargan statistics may be negative.**

Dynamic panel-data estimation, two-step system GMM

Group variable: id	Number of obs	=	891
Time variable : year	Number of groups	=	140
Number of instruments = 127	Obs per group: min	=	6
F(10, 139) = 413.26	avg	=	6.36
Prob > F = 0.000	max	=	8

n	Coef.	Corrected Std. Err.	t	P> t	[95% Conf. Interval]	
n						
L1.	.8207551	.0610521	13.44	0.000	.7000442	.941466
w						
--.	-.591436	.1442714	-4.10	0.000	-.8766863	-.3061857
L1.	.2690367	.1042514	2.58	0.011	.0629132	.4751603
k						
--.	.3461122	.0693599	4.99	0.000	.2089754	.483249
L1.	-.1913082	.0710708	-2.69	0.008	-.3318278	-.0507886
yr1980	-.025163	.0117715	-2.14	0.034	-.0484374	-.0018886
yr1981	-.0621389	.0179746	-3.46	0.001	-.0976779	-.0265998
yr1982	-.0300437	.0186313	-1.61	0.109	-.0668811	.0067937
yr1983	-.0083622	.0217817	-0.38	0.702	-.0514285	.034704
yr1984	-.0204903	.0309258	-0.66	0.509	-.0816361	.0406555
_cons	1.263666	.3203357	3.94	0.000	.6303054	1.897026

Instruments for first differences equation

Standard
D.(yr1980 yr1981 yr1982 yr1983 yr1984) missing recoded as zero
GMM-type (missing=0, separate instruments for each period unless collapsed)
L(1/.).(L.n w k)

Instruments for levels equation

Standard
_cons
yr1980 yr1981 yr1982 yr1983 yr1984 missing recoded as zero
GMM-type (missing=0, separate instruments for each period unless collapsed)
D.(L.n w k)

Arellano-Bond test for AR(1) in first differences: z = **-4.12** Pr > z = **0.000**
Arellano-Bond test for AR(2) in first differences: z = **-0.46** Pr > z = **0.646**

Sargan test of overid. restrictions: chi2(116) = **346.52** Prob > chi2 = **0.000**
(Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(116) = **126.00** Prob > chi2 = **0.248**
(Robust, but can be weakened by many instruments.)

Difference-in-Hansen tests of exogeneity of instrument subsets:

GMM instruments for levels

Hansen test excluding group: chi2(93) = 104.53 Prob > chi2 = 0.194
 Difference (null H = exogenous): chi2(23) = 21.47 Prob > chi2 = 0.553
 iv(yr1980 yr1981 yr1982 yr1983 yr1984, mz)
 Hansen test excluding group: chi2(111) = 123.34 Prob > chi2 = 0.199
 Difference (null H = exogenous): chi2(5) = 2.65 Prob > chi2 = 0.753

```
. xtabond2 n l(1/2).n l(0/1).w l(0/2).(k ys) yr1980-yr1984, gmm(l.n w k) ///
> iv(yr1980-yr1984) robust twostep small
```

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Warning: Two-step estimated covariance matrix of moments is singular.

Using a generalized inverse to calculate optimal weighting matrix for two-step estimation.

Difference-in-Sargan statistics may be negative.

Dynamic panel-data estimation, two-step system GMM

Group variable: id	Number of obs	=	751
Time variable : year	Number of groups	=	140
Number of instruments = 120	Obs per group: min	=	5
F(15, 139) = 1128.31	avg	=	5.36
Prob > F = 0.000	max	=	7

n	Corrected		t	P> t	[95% Conf. Interval]	
	Coef.	Std. Err.				
n						
L1.	.9847708	.0591053	16.66	0.000	.8679092	1.101632
L2.	-.0444599	.0532234	-0.84	0.405	-.149692	.0607722
w						
--.	-.5015799	.2033974	-2.47	0.015	-.9037328	-.0994271
L1.	.4045313	.1670457	2.42	0.017	.0742523	.7348102
k						
--.	.3234514	.0525199	6.16	0.000	.2196103	.4272926
L1.	-.1550519	.0667629	-2.32	0.022	-.2870539	-.0230498
L2.	-.1195921	.041634	-2.87	0.005	-.20191	-.0372743
ys						
--.	.6120864	.2343692	2.61	0.010	.1486967	1.075476
L1.	-.4190762	.3208354	-1.31	0.194	-1.053425	.2152725
L2.	-.2492855	.2154591	-1.16	0.249	-.6752865	.1767155
yr1980	.0256293	.0170605	1.50	0.135	-.0081023	.0593609
yr1981	.0157888	.0339909	0.46	0.643	-.0514172	.0829947
yr1982	.0136977	.0330476	0.41	0.679	-.0516432	.0790387
yr1983	.0078038	.0345048	0.23	0.821	-.0604182	.0760258
yr1984	-.0194111	.0331093	-0.59	0.559	-.0848741	.046052
_cons	.6392791	1.000564	0.64	0.524	-1.339014	2.617572

Instruments for first differences equation

Standard

D.(yr1980 yr1981 yr1982 yr1983 yr1984)

GMM-type (missing=0, separate instruments for each period unless collapsed)

L(1/).(L.n w k)

Instruments for levels equation

Standard

```

yr1980 yr1981 yr1982 yr1983 yr1984
GMM-type (missing=0, separate instruments for each period unless collapsed)
D. (L.n w k)

```

```

Arellano-Bond test for AR(1) in first differences: z = -3.32 Pr > z = 0.001
Arellano-Bond test for AR(2) in first differences: z = -0.88 Pr > z = 0.380

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Sargan test of overid. restrictions: chi2(104) = 232.10 Prob > chi2 = 0.000
(Not robust, but not weakened by many instruments.)

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Hansen test of overid. restrictions: chi2(104) = 104.62 Prob > chi2 = 0.465
(Robust, but can be weakened by many instruments.)

```

Difference-in-Hansen tests of exogeneity of instrument subsets:

GMM instruments for levels

```

Hansen test excluding group: chi2(83) = 88.35 Prob > chi2 = 0.323
Difference (null H = exogenous): chi2(21) = 16.26 Prob > chi2 = 0.755
iv(yr1980 yr1981 yr1982 yr1983 yr1984)
Hansen test excluding group: chi2(99) = 99.66 Prob > chi2 = 0.463
Difference (null H = exogenous): chi2(5) = 4.96 Prob > chi2 = 0.421

```

```

. xtabond2 n l(1/2).n l(0/1).w l(0/2).(k ys), gmm(w k, lag(1 .)) gmm(ys, lag(2 .)) ///
> iv(yr198*, eq(lev)) robust twostep

```

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Warning: Two-step estimated covariance matrix of moments is singular.

Using a generalized inverse to calculate optimal weighting matrix for two-step estimation.

Difference-in-Sargan statistics may be negative.

Dynamic panel-data estimation, two-step system GMM

```

Group variable: id                Number of obs    =    751
Time variable : year             Number of groups =    140
Number of instruments = 120      Obs per group: min =     5
Wald chi2(10) = 15733.32         avg =            5.36
Prob > chi2 = 0.000              max =            7

```

	n	Coef.	Corrected Std. Err.	z	P> z	[95% Conf. Interval]	
n							
L1.		.8848167	.0755632	11.71	0.000	.7367156	1.032918
L2.		.0454092	.0731628	0.62	0.535	-.0979872	.1888056
w							
---		-.426946	.180122	-2.37	0.018	-.7799786	-.0739133
L1.		.4493624	.152712	2.94	0.003	.1500525	.7486724
k							
---		.3542483	.046831	7.56	0.000	.2624611	.4460355
L1.		-.148886	.0626529	-2.38	0.017	-.2716835	-.0260885
L2.		-.1525707	.0416333	-3.66	0.000	-.2341705	-.0709709
ys							
---		.4981057	.12319	4.04	0.000	.2566576	.7395537
L1.		-.5022089	.2111277	-2.38	0.017	-.9160116	-.0884061
L2.		.1059397	.1384379	0.77	0.444	-.1653936	.3772731
_cons		-.4612574	.4247924	-1.09	0.278	-1.293835	.3713204

Prob > F = **0.000** max = **7**

Instruments for first differences equation

GMM-type (missing=0, separate instruments for each period unless collapsed)

L(1/.) (w k)

L(2/.) ys

Instruments for levels equation

Standard

_cons

yr1980 yr1981 yr1982 yr1983 yr1984

GMM-type (missing=0, separate instruments for each period unless collapsed)

D. (w k)

DL.ys

Arellano-Bond test for AR(1) in first differences: z = **-2.88** Pr > z = **0.004**

Arellano-Bond test for AR(2) in first differences: z = **-1.53** Pr > z = **0.125**

Sargan test of overid. restrictions: chi2(**109**) = **282.91** Prob > chi2 = **0.000**
(Not robust, but not weakened by many instruments.)

Hansen test of overid. restrictions: chi2(**109**) = **115.03** Prob > chi2 = **0.328**
(Robust, but can be weakened by many instruments.)

Difference-in-Hansen tests of exogeneity of instrument subsets:

GMM instruments for levels

Hansen test excluding group: chi2(**88**) = **89.64** Prob > chi2 = **0.431**

Difference (null H = exogenous): chi2(**21**) = **25.39** Prob > chi2 = **0.230**

gmm(w k, lag(1 .))

Hansen test excluding group: chi2(**29**) = **38.58** Prob > chi2 = **0.110**

Difference (null H = exogenous): chi2(**80**) = **76.46** Prob > chi2 = **0.592**

gmm(ys, lag(2 .))

Hansen test excluding group: chi2(**75**) = **79.06** Prob > chi2 = **0.352**

Difference (null H = exogenous): chi2(**34**) = **35.97** Prob > chi2 = **0.376**

iv(yr1980 yr1981 yr1982 yr1983 yr1984, eq(level))

Hansen test excluding group: chi2(**104**) = **109.67** Prob > chi2 = **0.333**

Difference (null H = exogenous): chi2(**5**) = **5.36** Prob > chi2 = **0.374**

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