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 Statistics/Data Analysis

User: qerw

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Statistics/Data Analysis
MP - Parallel Edition

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Notes:

1. Unicode is supported; see [help unicode advice](#).
2. More than 2 billion observations are allowed; see [help obs advice](#).
3. Maximum number of variables is set to 5000; see [help set maxvar](#).

```
1 . doedit "C:\Users\HP\Desktop\ASSIGNMENT\STATA\ASS 2\STATA DO FILE.do"
2 . import excel "C:\Users\HP\Desktop\ASSIGNMENT\STATA\ASS 2\restructured_data.xlsx", sheet("restru
  > _data") firstrow
3 . do "C:\Users\HP\AppData\Local\Temp\STD4b3c_000000.tmp"
4 . */Tobins_Q
5 . gen Tobins_Q = MarketCapitalization / TotalAssets
6 .
7 . */Descriptive Statistics
8 . summarize IndependentDirectors WomenonBoard BoardSize MarketCapitalization ReturnonAssets Retur
  > monEquity Revenue TotalAssets TotalDebtTotalAssets Tobins_Q
```

Variable	Obs	Mean	Std. Dev.	Min	Max
Independent~s	790	6.870886	2.088908	0	16
WomenonBoard	790	2.281013	1.273507	0	7
BoardSize	790	10.37342	2.249022	4	20
MarketCapi~n	790	29001.75	45739.02	458.9346	279200.5
ReturnonAs~s	790	9.393534	22.36122	-21.752	236.7815
ReturnonCo~y	790	37.00901	143.0727	-117.2775	2409.862
Revenue	790	6.767395	20.45044	-77.8846	289.675
TotalAssets	790	36789.41	70410.92	63.852	411275
TotalDebtT~s	790	25.92653	14.58174	0	73.5557
Tobins_Q	790	1.936613	6.190171	.072868	80.07021

```
9 . summarize IndependentDirectors WomenonBoard BoardSize MarketCapitalization ReturnonAssets Retur
  > monEquity Revenue TotalAssets TotalDebtTotalAssets Tobins_Q,detail
```

Independent Directors

Percentiles	Smallest
1%	2
	0

5%	4	0		
10%	5	0	Obs	790
25%	5	0	Sum of Wgt.	790

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50%	7		Mean	6.870886
75%	8	Largest	Std. Dev.	2.088908
90%	10	12	Variance	4.363537
95%	11	13	Skewness	.3352142
99%	12	14	Kurtosis	3.665426
		16		

Women on Board

Percentiles		Smallest		
1%	0	0		
5%	0	0		
10%	1	0	Obs	790
25%	1	0	Sum of Wgt.	790
50%	2		Mean	2.281013
		Largest	Std. Dev.	1.273507
75%	3	6		
90%	4	7	Variance	1.621819
95%	4	7	Skewness	.402627
99%	6	7	Kurtosis	3.25653

Board Size

Percentiles		Smallest		
1%	6	4		
5%	7	5		
10%	8	5	Obs	790
25%	9	5	Sum of Wgt.	790
50%	10		Mean	10.37342
		Largest	Std. Dev.	2.249022
75%	12	20		
90%	13	20	Variance	5.058101
95%	14	20	Skewness	.8355932
99%	17	20	Kurtosis	4.9554

Market Capitalization

Percentiles		Smallest		
1%	685.1434	458.9346		
5%	2048.746	546.6728		
10%	3191.977	585.5717	Obs	790
25%	5778.408	593.4701	Sum of Wgt.	790
50%	9758.623		Mean	29001.75
		Largest	Std. Dev.	45739.02
75%	28181.72	240899.2		
90%	91481.46	240899.2	Variance	2.09e+09
95%	129603.6	279200.5	Skewness	2.775367
99%	229987.8	279200.5	Kurtosis	11.19177

Return on Assets

Percentiles		Smallest		
1%	-9.5303	-21.752		
5%	-2.2935	-21.5382		
10%	.6417	-18.8991	Obs	790
25%	3.4577	-16.8484	Sum of Wgt.	790

50%	6.3032		Mean	9.393534
		Largest	Std. Dev.	22.36122
75%	10.396	233.8134		
90%	14.66805	234.1436	Variance	500.0242
95%	18.3247	235.4636	Skewness	8.276087
99%	136.2455	236.7815	Kurtosis	78.51105

Return on Common Equity

	Percentiles	Smallest		
1%	-43.1202	-117.2775		
5%	-3.7862	-68.5805		
10%	2.4183	-66.5977	Obs	790
25%	9.4809	-66.0136	Sum of Wgt.	790
50%	17.61955		Mean	37.00901
		Largest	Std. Dev.	143.0727
75%	28.3803	1142.486		
90%	50.11585	1692.88	Variance	20469.81
95%	96.83918	1764.998	Skewness	11.50962
99%	388.9141	2409.862	Kurtosis	156.1409

Revenue

	Percentiles	Smallest		
1%	-36.0001	-77.8846		
5%	-13.2013	-73.2059		
10%	-7.3484	-44.2413	Obs	790
25%	-.8753	-37.3115	Sum of Wgt.	790
50%	4.7542		Mean	6.767395
		Largest	Std. Dev.	20.45044
75%	11.848	116.9717		
90%	22.89605	135.2412	Variance	418.2203
95%	31.2555	240.5975	Skewness	5.920707
99%	57.6393	289.675	Kurtosis	74.25829

Total Assets

	Percentiles	Smallest		
1%	81.2137	63.852		
5%	950.525	65.4098		
10%	2056.003	67.2336	Obs	790
25%	4530.179	74.1916	Sum of Wgt.	790
50%	11590.22		Mean	36789.41
		Largest	Std. Dev.	70410.92
75%	37525.48	407097		
90%	82154.75	407097	Variance	4.96e+09
95%	181935.1	411275	Skewness	3.514537
99%	399194	411275	Kurtosis	15.83104

Total Debt/Total Assets

	Percentiles	Smallest		
1%	0	0		
5%	1.1176	0		
10%	5.6976	0	Obs	790
25%	17.1624	0	Sum of Wgt.	790

50%	25.2489		Mean	25.92653
75%	34.4999	Largest	Std. Dev.	14.58174
90%	44.92445	69.6019		
95%	53.577	70.7743	Variance	212.627
99%	62.9835	71.0513	Skewness	.3636992
		73.5557	Kurtosis	3.093541

Tobins_Q

	Percentiles	Smallest		
1%	.1656814	.072868		
5%	.357651	.1089623		
10%	.4393916	.1231035	Obs	790
25%	.5937994	.1286896	Sum of Wgt.	790
50%	.9808828		Mean	1.936613
		Largest	Std. Dev.	6.190171
75%	1.808571	61.14171		
90%	2.742956	61.6499	Variance	38.31822
95%	3.476232	73.30247	Skewness	9.623893
99%	37.75993	80.07021	Kurtosis	100.3216

10 . */Test of Normality
11 . sktest IndependentDirectors

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	joint Prob>chi2
Independen~s	790	0.0002	0.0021	20.58	0.0000

12 . sktest WomenonBoard

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	joint Prob>chi2
WomenonBoard	790	0.0000	0.1454	19.42	0.0001

13 . sktest BoardSize

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	joint Prob>chi2
BoardSize	790	0.0000	0.0000	.	0.0000

14 . sktest MarketCapitalization

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	joint Prob>chi2
MarketCapi~n	790	0.0000	0.0000	.	0.0000

15 . sktest ReturnonAssets

Skewness/Kurtosis tests for Normality					
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	joint Prob>chi2
ReturnonAs~s	790	0.0000	0.0000	.	0.0000

16 . sktest ReturnonCommonEquity

Skewness/Kurtosis tests for Normality					
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	joint Prob>chi2
ReturnonCo~y	790	0.0000	0.0000	.	0.0000

17 . sktest Revenue

Skewness/Kurtosis tests for Normality					
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	joint Prob>chi2
Revenue	790	0.0000	0.0000	.	0.0000

18 . sktest TotalAssets

Skewness/Kurtosis tests for Normality					
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	joint Prob>chi2
TotalAssets	790	0.0000	0.0000	.	0.0000

19 . sktest TotalDebtTotalAssets

Skewness/Kurtosis tests for Normality					
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	joint Prob>chi2
TotalDebtT~s	790	0.0000	0.5171	15.28	0.0005

20 . sktest Tobins_Q

Skewness/Kurtosis tests for Normality					
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	joint Prob>chi2
Tobins_Q	790	0.0000	0.0000	.	0.0000

21 .

22 . */Perform Pearson's correlation analysis for specified variables

23 . correlate IndependentDirectors WomenonBoard E F BoardSize MarketCapitalization ReturnonAssets R
> nCommonEquity Revenue TotalAssets TotalDebtTotalAssets Tobins_Q
(obs=790)

	Indepe~s	Womeno~d	E	F	BoardS~e	Market~n	Return~s	Return~y	Revenue
Independen~s	1.0000								
WomenonBoard	0.5149	1.0000							
E	0.7450	0.3011	1.0000						
F	0.3228	0.9136	0.3430	1.0000					
BoardSize	0.6445	0.4965	0.0119	0.1559	1.0000				
MarketCapi~n	0.5674	0.2955	0.4437	0.1907	0.3382	1.0000			
ReturnonAs~s	-0.0940	0.0252	-0.0107	0.1024	-0.1346	-0.0570	1.0000		
ReturnonCo~y	-0.0466	0.0524	0.0081	0.1060	-0.0792	-0.0503	0.8980	1.0000	
Revenue	-0.1312	-0.1048	-0.0838	-0.0770	-0.1203	-0.0583	0.0604	0.0369	1.0000
TotalAssets	0.4764	0.1949	0.3549	0.0960	0.3100	0.8945	-0.0958	-0.0729	-0.0709
TotalDebtT~s	0.0380	0.0821	0.0106	0.0940	0.0403	-0.0065	-0.1970	-0.0959	-0.1251
Tobins_Q	-0.0913	0.0183	-0.0052	0.0922	-0.1299	-0.0721	0.9485	0.8978	0.0587
	TotalA~s	TotalD~s	Tobins_Q						
TotalAssets	1.0000								
TotalDebtT~s	-0.0461	1.0000							
Tobins_Q	-0.0970	-0.1684	1.0000						

24 .

25 . pwcrr IndependentDirectors WomenonBoard E F BoardSize MarketCapitalization ReturnonAssets Retu
> mmonEquity Revenue TotalAssets TotalDebtTotalAssets Tobins_Q,sig

	Indepe~s	Womeno~d	E	F	BoardS~e	Market~n	Return~s
Independen~s	1.0000						
WomenonBoard	0.5149	1.0000					
E	0.7450	0.3011	1.0000				
F	0.3228	0.9136	0.3430	1.0000			
BoardSize	0.6445	0.4965	0.0119	0.1559	1.0000		
MarketCapi~n	0.5674	0.2955	0.4437	0.1907	0.3382	1.0000	
ReturnonAs~s	-0.0940	0.0252	-0.0107	0.1024	-0.1346	-0.0570	1.0000
ReturnonCo~y	-0.0466	0.0524	0.0081	0.1060	-0.0792	-0.0503	0.8980
Revenue	-0.1312	-0.1048	-0.0838	-0.0770	-0.1203	-0.0583	0.0604
TotalAssets	0.4764	0.1949	0.3549	0.0960	0.3100	0.8945	-0.0958
TotalDebtT~s	0.0380	0.0821	0.0106	0.0940	0.0403	-0.0065	-0.1970
Tobins_Q	-0.0913	0.0183	-0.0052	0.0922	-0.1299	-0.0721	0.9485

	Return~y	Revenue	TotalA~s	TotalD~s	Tobins Q
ReturnonCo~y	1.0000				
Revenue	0.0369 0.3009	1.0000			
TotalAssets	-0.0729 0.0404	-0.0709 0.0462	1.0000		
TotalDebtT~s	-0.0959 0.0070	-0.1251 0.0004	-0.0461 0.1954	1.0000	
Tobins_Q	0.8978 0.0000	0.0587 0.0991	-0.0970 0.0063	-0.1684 0.0000	1.0000

```

26 .
27 . */Calculating new variables
28 . */Create a numeric version of the CompanyTicker variable
29 . encode CompanyTicker, gen(CompanyTicker_num)

30 . */Sort the data by the numeric CompanyTicker and FiscalYear
31 . sort CompanyTicker_num FiscalYear

32 .
33 . */Set the panel structure
34 . tsset CompanyTicker_num FiscalYear
    panel variable:  CompanyTicker_num (strongly balanced)
    time variable:  FiscalYear, 2010 to 2019
                   delta: 1 unit

35 .
36 . * Generate the lagged Revenue variable
37 . gen Revenue_lag = L.Revenue
    (79 missing values generated)

38 .
39 . * Calculate the revenue growth rate
40 . gen RG = (Revenue - Revenue_lag) / Revenue_lag
    (79 missing values generated)

41 .
42 . * Generate the Financial Leverage (LG) variable
43 . gen LG = TotalDebt / TotalAssets

44 .
45 . * List the results to check
46 . list CompanyTicker FiscalYear TotalDebt TotalAssets LG in 1/10

```

	CompanyTicker	Fiscal~r	TotalD~s	TotalA~s	LG
1.	1986986D LN Equity	2010	17.7419	88852	.0001997
2.	1986986D LN Equity	2011	15.4557	102920	.0001502
3.	1986986D LN Equity	2012	21.9149	129273	.0001695
4.	1986986D LN Equity	2013	23.845	139178	.0001713
5.	1986986D LN Equity	2014	22.8441	151413	.0001509
6.	1986986D LN Equity	2015	25.0201	124580	.0002008
7.	1986986D LN Equity	2016	30.618	118953	.0002574
8.	1986986D LN Equity	2017	26.0448	117006	.0002226
9.	1986986D LN Equity	2018	23.9345	111993	.0002137
10.	1986986D LN Equity	2019	24.6161	100861	.0002441

```

47 .
48 . * List the results to check
49 . list CompanyTicker FiscalYear Revenue Revenue_lag RG in 1/10

```

	CompanyTicker	Fiscal~r	Revenue	Revenu~g	RG
1.	1986986D LN Equity	2010	5.1523	.	.
2.	1986986D LN Equity	2011	35.8745	5.1523	5.962813
3.	1986986D LN Equity	2012	.6788	35.8745	-.9810785
4.	1986986D LN Equity	2013	-8.6852	.6788	-13.79493
5.	1986986D LN Equity	2014	-13.9357	-8.6852	.6045342
6.	1986986D LN Equity	2015	-21.3629	-13.9357	.5329621
7.	1986986D LN Equity	2016	-36.0001	-21.3629	.6851692
8.	1986986D LN Equity	2017	25.1094	-36.0001	-1.697481
9.	1986986D LN Equity	2018	20.6743	25.1094	-.176631
10.	1986986D LN Equity	2019	2.6873	20.6743	-.8700173

```

50 .
51 . * Generate the Firm Size (FS) variable as the natural logarithm of total assets
52 . gen FS = log(TotalAssets)
53 .
54 . * List the results to check
55 . list CompanyTicker FiscalYear TotalAssets FS in 1/10

```

	CompanyTicker	Fiscal~r	TotalA~s	FS
1.	1986986D LN Equity	2010	88852	11.39473
2.	1986986D LN Equity	2011	102920	11.54171
3.	1986986D LN Equity	2012	129273	11.76968
4.	1986986D LN Equity	2013	139178	11.84351
5.	1986986D LN Equity	2014	151413	11.92777
6.	1986986D LN Equity	2015	124580	11.7327
7.	1986986D LN Equity	2016	118953	11.68648
8.	1986986D LN Equity	2017	117006	11.66998
9.	1986986D LN Equity	2018	111993	11.62619
10.	1986986D LN Equity	2019	100861	11.5215

```

56 .
57 .
58 . * Regression for Return on Assets (ROA)
59 . reg ReturnonAssets IndependentDirectors WomenonBoard BoardSize RG LG FS

```

Source	SS	df	MS	Number of obs	=	711
Model	97638.8266	6	16273.1378	F(6, 704)	=	40.34
Residual	284013.734	704	403.4286	Prob > F	=	0.0000
Total	381652.561	710	537.538818	R-squared	=	0.2558
				Adj R-squared	=	0.2495
				Root MSE	=	20.086

ReturnonAssets	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
IndependentDirectors	2.330191	.5604093	4.16	0.000	1.229918	3.430465
WomenonBoard	2.633288	.7362983	3.58	0.000	1.187685	4.078892
BoardSize	-1.013737	.4781457	-2.12	0.034	-1.9525	-.0749752
RG	.0010896	.0135636	0.08	0.936	-.0255403	.0277195
LG	295.6722	63.10512	4.69	0.000	171.7754	419.5689
FS	-7.247097	.6687601	-10.84	0.000	-8.5601	-5.934094
_cons	64.3876	5.708811	11.28	0.000	53.17927	75.59593

60 . * Check for multicollinearity
61 . vif

Variable	VIF	1/VIF
Independen~s	2.36	0.422933
BoardSize	1.96	0.510445
FS	1.87	0.534853
WomenonBoard	1.49	0.671153
LG	1.22	0.817759
RG	1.00	0.996010
Mean VIF	1.65	

62 .
63 . * Regression for Return on Equity (ROE)
64 . reg ReturnonCommonEquity IndependentDirectors WomenonBoard BoardSize RG LG FS

Source	SS	df	MS	Number of obs	=	711
Model	2659034.09	6	443172.349	F(6, 704)	=	23.51
Residual	13270737.9	704	18850.4799	Prob > F	=	0.0000
				R-squared	=	0.1669
				Adj R-squared	=	0.1598
Total	15929772	710	22436.2985	Root MSE	=	137.3

ReturnonCommonEquity	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
IndependentDirectors	14.68778	3.830745	3.83	0.000	7.166732	22.20884
WomenonBoard	16.82116	5.033055	3.34	0.001	6.939567	26.70276
BoardSize	-4.640392	3.268422	-1.42	0.156	-11.05741	1.776629
RG	.0142239	.0927154	0.15	0.878	-.1678079	.1962556
LG	771.0237	431.3626	1.79	0.074	-75.88746	1617.935
FS	-43.27582	4.57139	-9.47	0.000	-52.25101	-34.30063
_cons	347.5171	39.02326	8.91	0.000	270.9012	424.133

65 . * Check for multicollinearity
66 . vif

Variable	VIF	1/VIF
Independen~s	2.36	0.422933
BoardSize	1.96	0.510445
FS	1.87	0.534853
WomenonBoard	1.49	0.671153
LG	1.22	0.817759
RG	1.00	0.996010
Mean VIF	1.65	

```
67 .
68 .
69 . * Regression for Tobin's Q
70 . reg Tobins_Q IndependentDirectors WomenonBoard BoardSize RG LG FS
```

Source	SS	df	MS	Number of obs	=	711
Model	7759.48053	6	1293.24675	F(6, 704)	=	41.15
Residual	22122.3669	704	31.4238166	Prob > F	=	0.0000
				R-squared	=	0.2597
				Adj R-squared	=	0.2534
Total	29881.8474	710	42.087109	Root MSE	=	5.6057

Tobins_Q	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
IndependentDirectors	.7038252	.1564053	4.50	0.000	.3967485 1.010902
WomenonBoard	.630463	.2054944	3.07	0.002	.2270078 1.033918
BoardSize	-.2544778	.1334462	-1.91	0.057	-.516478 .0075225
RG	.0002023	.0037855	0.05	0.957	-.0072298 .0076345
LG	77.81394	17.61208	4.42	0.000	43.23545 112.3924
FS	-2.112614	.1866451	-11.32	0.000	-2.479062 -1.746166
_cons	17.7813	1.593279	11.16	0.000	14.65316 20.90945

```
71 . * Check for multicollinearity
72 . vif
```

Variable	VIF	1/VIF
Independen~s	2.36	0.422933
BoardSize	1.96	0.510445
FS	1.87	0.534853
WomenonBoard	1.49	0.671153
LG	1.22	0.817759
RG	1.00	0.996010
Mean VIF	1.65	

```
73 .
74 .
75 .
76 . *ROA PANEL REGRESSION
77 . * Estimate Fixed Effects model
78 . xtreg ReturnonAssets IndependentDirectors WomenonBoard BoardSize RG LG FS, fe
```

Fixed-effects (within) regression	Number of obs	=	711
Group variable: CompanyTic~m	Number of groups	=	79
R-sq:	Obs per group:		
within = 0.0529	min =		9
between = 0.2658	avg =		9.0
overall = 0.2264	max =		9
corr(u_i, Xb) = 0.3321	F(6, 626)	=	5.83
	Prob > F	=	0.0000

ReturnonAssets	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
IndependentDirectors	-.1175065	.4495001	-0.26	0.794	-1.000217	.7652042
WomenonBoard	.8944469	.3980246	2.25	0.025	.1128218	1.676072
BoardSize	.3681948	.3985105	0.92	0.356	-.4143845	1.150774
RG	-.0011444	.0056859	-0.20	0.841	-.0123101	.0100213
LG	.133.9974	28.91018	4.63	0.000	77.22471	190.7701
FS	-2.347978	1.16704	-2.01	0.045	-4.639766	-.0561903
_cons	25.83828	10.91523	2.37	0.018	4.403375	47.27318
sigma_u	20.245334					
sigma_e	7.9178476					
rho	.86733635	(fraction of variance due to u_i)				

F test that all u_i=0: F(78, 626) = 50.05 Prob > F = 0.0000

```
79 . estimates store fe_model
```

80 .

```
81 . * Estimate Random Effects model
```

```
82 . xtreg ReturnonAssets IndependentDirectors WomenonBoard BoardSize RG LG FS, re
```

Random-effects GLS regression	Number of obs	=	711
Group variable: CompanyTic~m	Number of groups	=	79

Group variable: **CompanyTic~m** Number of groups = **79**

```
R-sq:          within = 0.0509
              between = 0.2574
              overall = 0.2294

Obs per group:  min = 9
                avg = 9.0
                max = 9
```

```
Obs per group:      min =      9
                    avg =     9.0
                    max =      9
```

```
corr(u_i, X) = 0 (assumed)      Wald chi2(6) = 54.63
                                Prob > chi2 = 0.0000
```

ReturnonAssets	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
IndependentDirectors	.005593	.4362958	0.01	0.990	-.8495311	.8607172
WomenonBoard	1.093561	.3890147	2.81	0.005	.331106	1.856016
BoardSize	.2703499	.3859502	0.70	0.484	-.4860986	1.026798
RG	-.0010142	.0057176	-0.18	0.859	-.0122205	.010192
LG	133.2886	28.91515	4.61	0.000	76.61592	189.9612
FS	-4.049317	.925387	-4.38	0.000	-5.863042	-2.235591
_cons	41.55307	8.8803	4.68	0.000	24.14801	58.95814
sigma_u	18.474185					
sigma_e	7.9178476					
rho	.84481633	(fraction of variance due to u_i)				

```
83 . estimates store re model
```

84 .

85 . * Perform Hausman test
86 . hausman fe_model re_model

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fe_model	(B) re_model		
Independen~s	-.1175065	.005593	-.1230995	.1081494
WomenonBoard	.8944469	1.093561	-.199114	.0842087
BoardSize	.3681948	.2703499	.0978449	.0992626
RG	-.0011444	-.0010142	-.0001302	.
LG	133.9974	133.2886	.7088096	.
FS	-2.347978	-4.049317	1.701338	.711085

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 7.51
Prob>chi2 = 0.2765
(V_b-V_B is not positive definite)

87 .
88 .
89 .
90 . *ROE PANEL REGRESSION
91 . * Estimate Fixed Effects model
92 . xtreg ReturnonCommonEquity IndependentDirectors WomenonBoard BoardSize RG LG FS, fe

Fixed-effects (within) regression Number of obs = 711
Group variable: CompanyTic~m Number of groups = 79

R-sq: Obs per group:
within = 0.0220 min = 9
between = 0.1677 avg = 9.0
overall = 0.1240 max = 9

corr(u_i, Xb) = 0.1684 F(6, 626) = 2.35
Prob > F = 0.0300

ReturnonCommonEquity	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
IndependentDirectors	5.675452	4.754041	1.19	0.233	-3.660348	15.01125
WomenonBoard	6.345591	4.209622	1.51	0.132	-1.921099	14.61228
BoardSize	-2.467097	4.214761	-0.59	0.559	-10.74388	5.809686
RG	.0163123	.0601352	0.27	0.786	-.1017789	.1344035
LG	-868.4063	305.7623	-2.84	0.005	-1468.85	-267.9623
FS	-26.78609	12.34295	-2.17	0.030	-51.02469	-2.547487
_cons	265.1031	115.4426	2.30	0.022	38.40142	491.8047
sigma_u	118.41289					
sigma_e	83.741412					
rho	.66660906	(fraction of variance due to u_i)				

F test that all u_i=0: F(78, 626) = 16.24 Prob > F = 0.0000

93 . estimates store fe_model2

94 .

95 . * Estimate Random Effects model

96 . xtreg ReturnonCommonEquity IndependentDirectors WomenonBoard BoardSize RG LG FS, re

Random-effects GLS regression
Group variable: **CompanyTic~m**

Number of obs = **711**
Number of groups = **79**

R-sq:

within = **0.0205**
between = **0.1840**
overall = **0.1370**

Obs per group:

min = **9**
avg = **9.0**
max = **9**

corr(u_i, X) = **0** (assumed)

Wald chi2(6) = **31.27**
Prob > chi2 = **0.0000**

ReturnonCommonEquity	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
IndependentDirectors	7.07709	4.305045	1.64	0.100	-1.360643 15.51482
WomenonBoard	8.351382	3.974583	2.10	0.036	.5613429 16.14142
BoardSize	-2.619128	3.780794	-0.69	0.488	-10.02935 4.791092
RG	.0161242	.0602941	0.27	0.789	-.10205 .1342984
LG	-748.2763	302.7927	-2.47	0.013	-1341.739 -154.8135
FS	-37.49067	7.322069	-5.12	0.000	-51.84166 -23.13967
_cons	352.4155	68.80717	5.12	0.000	217.5559 487.2751
sigma_u	105.69883				
sigma_e	83.741412				
rho	.61437035	(fraction of variance due to u_i)			

97 . estimates store re_model2

98 .

99 . * Perform Hausman test

100 . hausman fe_model2 re_model2

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fe_model2	(B) re_model2		
Independen~s	5.675452	7.07709	-1.401639	2.016803
WomenonBoard	6.345591	8.351382	-2.005791	1.386941
BoardSize	-2.467097	-2.619128	.1520309	1.862742
RG	.0163123	.0161242	.0001881	.
LG	-868.4063	-748.2763	-120.13	42.51056
FS	-26.78609	-37.49067	10.70458	9.936585

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= **52.12**
Prob>chi2 = **0.0000**
(V_b-V_B is not positive definite)

```

101 .
102 .
103 .
104 . *TOBIN'S Q PANEL REGRESSION
105 . * Estimate Fixed Effects model
106 . xtreg Tobins_Q IndependentDirectors WomenonBoard BoardSize RG LG FS, fe

```

Fixed-effects (within) regression

Group variable: **CompanyTic~m**

```
Number of obs      =      711
```

Number of groups = 79

R-sq:

```
within = 0.0225
```

between = 0.2694

```
overall = 0.2398
```

Obs per group:

min = 9

avg = 9.0

max = 9

$$F(6, 626) = 2.40$$
$$\text{Prob} > F = 0.0267$$

```
corr(u_i, Xb) = 0.3829
```

Tobins_Q	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
IndependentDirectors	.0490445	.108283	0.45	0.651	-.1635974 .2616864
WomenonBoard	.1847671	.0958827	1.93	0.054	-.0035237 .3730578
BoardSize	-.0348529	.0959998	-0.36	0.717	-.2233735 .1536677
RG	-.0001285	.0013697	-0.09	0.925	-.0028182 .0025613
LG	14.61005	6.964359	2.10	0.036	.9337148 28.28639
FS	-.6014605	.2811359	-2.14	0.033	-1.153544 -.0493769
_cons	7.18309	2.629441	2.73	0.006	2.019498 12.34668
sigma_u	5.8411407				
sigma_e	1.9073815				
rho	.90364432	(fraction of variance due to u_i)			

F test that all $u_i=0$: $F(78, 626) = 69.93$

Prob > F = 0.0000

```
107 . estimates store fe_model13
```

108 .

```
109 . * Estimate Random Effects model
```

```
110 . xtreg Tobins_Q IndependentDirectors WomenonBoard BoardSize RG LG FS, re
```

Random-effects GLS regression

Group variable: **CompanyTic~m**

```
Number of obs      =      711
```

Number of groups = 79

R-sq:

`within` = 0.0215

between = 0.2512

overall = 0.2282

Obs per group:

$$\min = 9$$

```
avg = 9.0
```

$$\max = 9$$
$$\text{corr}(u_i, X) = 0 \text{ (assumed)}$$

Wald chi2 (6) = 31.99

```
Prob > chi2      =      0.0000
```

Tobins_Q	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
IndependentDirectors	.0660063	.1064634	0.62	0.535	-.1426582	.2746708
WomenonBoard	.2362098	.0946382	2.50	0.013	.0507223	.4216974
BoardSize	-.0440378	.0942494	-0.47	0.640	-.2287632	.1406876
RG	-.0001193	.001383	-0.09	0.931	-.0028299	.0025914
LG	14.62971	7.002074	2.09	0.037	.9058946	28.35352
FS	-1.036712	.2355525	-4.40	0.000	-1.498386	-.5750371
_cons	11.1378	2.276576	4.89	0.000	6.675798	15.59981
sigma_u	5.1967018					
sigma_e	1.9073815					

rho | .88127769 (fraction of variance due to u_i)

111 . estimates store re_model3

112 .

113 . * Perform Hausman test

114 . hausman fe_model3 re_model3

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fe_model3	(B) re_model3		
Independen~s	.0490445	.0660063	-.0169617	.0197672
WomenonBoard	.1847671	.2362098	-.0514428	.015398
BoardSize	-.0348529	-.0440378	.0091848	.0182486
RG	-.0001285	-.0001193	-9.19e-06	.
LG	14.61005	14.62971	-.019656	.
FS	-.6014605	-1.036712	.4352511	.1534679

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 42.74
Prob>chi2 = 0.0000
(V_b-V_B is not positive definite)

115 .

116 .

117 . */Perform Pearson's correlation analysis for specified variables

118 . pwcorr IndependentDirectors WomenonBoard BoardSize Tobins_Q ReturnonAssets ReturnonCommonEquity

> FS,sig

	Indepe~s	Womeno~d	BoardS~e	Tobins_Q	Return~s	Return~y	RG
Independen~s	1.0000						
WomenonBoard	0.5149 0.0000	1.0000					
BoardSize	0.6445 0.0000	0.4965 0.0000	1.0000				
Tobins_Q	-0.0913 0.0102	0.0183 0.6081	-0.1299 0.0003	1.0000			
ReturnonAs~s	-0.0940 0.0082	0.0252 0.4802	-0.1346 0.0001	0.9485 0.0000	1.0000		
ReturnonCo~y	-0.0466 0.1904	0.0524 0.1412	-0.0792 0.0260	0.8978 0.0000	0.8980 0.0000	1.0000	
RG	-0.0530 0.1583	-0.0451 0.2298	-0.0267 0.4770	-0.0068 0.8573	-0.0060 0.8728	-0.0037 0.9209	1.0000
LG	-0.1867 0.0000	-0.0679 0.0566	-0.1612 0.0000	0.3070 0.0000	0.3014 0.0000	0.2011 0.0000	-0.0056 0.8814
FS	0.6102 0.0000	0.3475 0.0000	0.4851 0.0000	-0.4178 0.0000	-0.4130 0.0000	-0.3249 0.0000	-0.0148 0.6929

	LG	FS
LG	1.0000	
FS	-0.4122 0.0000	1.0000

119 .
120 .
121 .
122 .
end of do-file

123 . do "C:\Users\HP\AppData\Local\Temp\STD4b3c_000000.tmp"

124 . summarize IndependentDirectors WomenonBoard BoardSize ReturnonAssets ReturnonCommonEquity TotalDebtTotalAssets Tobins_Q RG LG FS

Variable	Obs	Mean	Std. Dev.	Min	Max
Independen~s	790	6.870886	2.088908	0	16
WomenonBoard	790	2.281013	1.273507	0	7
BoardSize	790	10.37342	2.249022	4	20
ReturnonAs~s	790	9.393534	22.36122	-21.752	236.7815
ReturnonCo~y	790	37.00901	143.0727	-117.2775	2409.862
TotalAssets	790	36789.41	70410.92	63.852	411275
TotalDebtT~s	790	25.92653	14.58174	0	73.5557
Tobins_Q	790	1.936613	6.190171	.072868	80.07021
RG	711	.6621927	55.6863	-256.7654	1442.837
LG	790	.004844	.0135229	0	.2523429
FS	790	9.397758	1.556177	4.156568	12.92702

125 .
end of do-file

126 . do "C:\Users\HP\AppData\Local\Temp\STD4b3c_000000.tmp"

127 . */Perform Pearson's correlation analysis for specified variables

128 . pwcorr IndependentDirectors WomenonBoard BoardSize Tobins_Q ReturnonAssets ReturnonCommonEquity
> FS,sig

	Indepe~s	Wome~d	BoardS~e	Tobins_Q	Return~s	Return~y	RG
Independen~s	1.0000						
WomenonBoard	0.5149 0.0000	1.0000					
BoardSize	0.6445 0.0000	0.4965 0.0000	1.0000				
Tobins_Q	-0.0913 0.0102	0.0183 0.6081	-0.1299 0.0003	1.0000			
ReturnonAs~s	-0.0940 0.0082	0.0252 0.4802	-0.1346 0.0001	0.9485 0.0000	1.0000		
ReturnonCo~y	-0.0466 0.1904	0.0524 0.1412	-0.0792 0.0260	0.8978 0.0000	0.8980 0.0000	1.0000	

RG	-0.0530 0.1583	-0.0451 0.2298	-0.0267 0.4770	-0.0068 0.8573	-0.0060 0.8728	-0.0037 0.9209	1.0000
LG	-0.1867 0.0000	-0.0679 0.0566	-0.1612 0.0000	0.3070 0.0000	0.3014 0.0000	0.2011 0.0000	-0.0056 0.8814
FS	0.6102 0.0000	0.3475 0.0000	0.4851 0.0000	-0.4178 0.0000	-0.4130 0.0000	-0.3249 0.0000	-0.0148 0.6929
		LG	FS				
LG	1.0000						
FS	-0.4122 0.0000	1.0000					

129 .
end of do-file

130 . do "C:\Users\HP\AppData\Local\Temp\STD4b3c_000000.tmp"

131 . */Test of Normality
132 . sktest IndependentDirectors

Skewness/Kurtosis tests for Normality						joint
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2	
Independen~s	790	0.0002	0.0021	20.58	0.0000	

133 . sktest WomenonBoard

Skewness/Kurtosis tests for Normality						joint
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2	
WomenonBoard	790	0.0000	0.1454	19.42	0.0001	

134 . sktest BoardSize

Skewness/Kurtosis tests for Normality						joint
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2	
BoardSize	790	0.0000	0.0000	.	0.0000	

135 . sktest ReturnonAssets

Skewness/Kurtosis tests for Normality						joint
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2	
ReturnonAs~s	790	0.0000	0.0000	.	0.0000	

136 . sktest ReturnonCommonEquity

Skewness/Kurtosis tests for Normality						joint
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)		Prob>chi2
ReturnonCo~y	790	0.0000	0.0000	.		0.0000

137 . sktest RG

Skewness/Kurtosis tests for Normality						joint
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)		Prob>chi2
RG	711	0.0000	0.0000	.		.

138 . sktest LG

Skewness/Kurtosis tests for Normality						joint
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)		Prob>chi2
LG	790	0.0000	0.0000	.		0.0000

139 . sktest FS

Skewness/Kurtosis tests for Normality						joint
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)		Prob>chi2
FS	790	0.0275	0.0098	10.75		0.0046

140 . sktest Tobins_Q

Skewness/Kurtosis tests for Normality						joint
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)		Prob>chi2
Tobins Q	790	0.0000	0.0000	.		0.0000

141 .
end of do-file

142 .