The Financial Impact of ISO 9000 Certification in the US: An Empirical Analysis

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Abstract

This document contains the full results of the event studies discussed in the paper. We show the descriptive statistics of the sample, and report the results using matching by industry, ROA and ASSETS, industry and ROA only, and industry and ASSETS only, using both single control firms and portfolios of control firms, for all 6 performance measures.

Table A1a: Summary statistics for certified and control firms using one-to-one matching by industry combined with ROA and/or ASSETS (year $t-2$)

	N	mean	median	st.dev.	min.	max.
certified firms						
TOTAL ASSETS[a]	554	1629.32	218.82	5717.09	1.57	74293.00
SALES[a]	554	1649.11	252.77	5546.70	3.43	79557.00
ROA[b]	554	15.72	15.26	8.12	-33.08	60.69
ROS[b]	554	13.28	12.52	8.30	-60.44	52.93
Tobin's Q[c]	501	1.51	1.04	1.49	0.10	14.25
COGS/SALES[b]	554	63.03	65.45	15.72	17.57	94.80
SALES/ASSETS[b]	554	127.40	121.62	45.42	18.34	395.47
control firms (matched by industry, ROA and ASSETS)						
TOTAL ASSETS[a]	554	1662.83	197.10	6266.39	1.32	86343.00
SALES[a]	554	1749.33	266.84	7097.30	1.70	110496.00
ROA[b]	554	15.66	15.16	8.03	-32.14	58.16
ROS[b]	554	13.30	12.52	15.65	-295.66	48.53
Tobin's Q[c]	449	1.50	1.18	1.22	-0.83	11.58
COGS/SALES[b]	554	63.67	66.48	16.98	12.93	147.36
SALES/ASSETS[b]	554	127.08	118.65	54.20	10.87	382.25
control firms (matched by industry, ROA)						
TOTAL ASSETS[a]	554	1681.39	71.71	9749.92	0.23	121307.70
SALES[a]	554	1577.76	96.27	8953.79	0.27	118571.60
ROA[b]	554	15.71	15.31	8.12	-32.14	62.82
ROS[b]	554	12.81	12.38	15.66	-295.66	42.67
Tobin's Q[c]	438	1.58	1.14	1.41	-0.07	11.58
COGS/SALES[b]	554	62.86	64.21	17.30	8.91	147.36
SALES/ASSETS[b]	554	133.08	124.34	59.88	10.87	456.15
control firms (matched by industry, ASSETS)						
TOTAL ASSETS[a]	554	1643.90	218.76	6275.25	1.48	85280.00
SALES[a]	554	1588.92	254.20	5755.14	1.25	78394.00
ROA[b]	554	12.73	12.80	10.55	-32.89	58.79
ROS[b]	554	9.31	11.15	25.01	-334.40	48.10
Tobin's Q[c]	457	1.37	1.00	1.13	-0.51	9.36
COGS/SALES[b]	554	63.33	65.72	18.10	10.38	162.75
SALES/ASSETS[b]	554	119.61	114.23	53.62	2.02	372.06

[a] TOTAL ASSETS and SALES are in millions of dollars.
[b] ROA, ROS, COGS/SALES and SALES/ASSETS are expressed in percentages.
[c] Tobin's Q is a dimensionless measure.

Table A1b: Summary statistics for certified and control firms using portfolio matching by industry combined with ROA and/or ASSETS (year $t-2$)

	N	mean	median	st.dev.	min.	max.
certified firms						
TOTAL ASSETS[a]	554	1629.32	218.82	5717.09	1.57	74293.00
SALES[a]	554	1649.11	252.77	5546.70	3.43	79557.00
ROA[b]	554	15.72	15.26	8.12	-33.08	60.69
ROS[b]	554	13.28	12.52	8.30	-60.44	52.93
Tobin's Q[c]	501	1.51	1.04	1.49	0.10	14.25
COGS/SALES[b]	554	63.03	65.45	15.72	17.57	94.80
SALES/ASSETS[b]	554	127.40	121.62	45.42	18.34	395.47
control firms (matched by industry, ROA and ASSETS)						
TOTAL ASSETS[a]	554	1690.09	200.72	6113.32	2.21	86343.00
SALES[a]	554	1770.13	254.16	6941.21	2.24	110496.00
ROA[b]	554	15.54	15.15	7.91	-31.38	58.16
ROS[b]	554	13.86	13.27	9.60	-115.14	53.68
Tobin's Q[c]	515	1.49	1.28	0.98	-0.83	5.62
COGS/SALES[b]	554	63.46	63.06	13.71	12.93	145.48
SALES/ASSETS[b]	554	125.76	121.31	44.49	20.99	382.22
control firms (matched by industry, ROA)						
TOTAL ASSETS[a]	554	1713.34	289.53	4519.50	7.83	50674.63
SALES[a]	554	1720.15	330.71	4750.46	5.36	53180.35
ROA[b]	554	15.66	15.35	8.02	-32.75	60.49
ROS[b]	554	12.69	13.04	8.72	-136.12	32.72
Tobin's Q[c]	548	1.57	1.35	0.98	0.11	7.90
COGS/SALES[b]	554	62.37	61.93	10.03	32.52	91.62
SALES/ASSETS[b]	554	137.59	135.69	28.33	47.50	250.52
control firms (matched by industry, ASSETS)						
TOTAL ASSETS[a]	554	1679.87	212.17	5806.56	2.16	65985.54
SALES[a]	554	1656.42	254.87	5744.50	2.64	68241.78
ROA[b]	554	10.58	11.40	7.01	-48.09	24.07
ROS[b]	554	1.33	9.73	33.81	-302.28	26.22
Tobin's Q[c]	554	1.43	1.31	0.73	0.12	4.82
COGS/SALES[b]	554	70.65	67.16	27.21	35.76	335.28
SALES/ASSETS[b]	554	117.82	121.69	25.46	55.11	242.46

[a] TOTAL ASSETS and SALES are in millions of dollars.
[b] ROA, ROS, COGS/SALES and SALES/ASSETS are expressed in percentages.
[c] Tobin's Q is a dimensionless measure.

Table A2: Abnormal performance in ROA; one-to-one matching, by industry, ROA, ASSETS

from year	N[a]	AP mean[b]	AP median[b]	sk[c]	*p*-value (*t*-test)[d]		*p*-value (WSR test)[d]		*p*-value (sign test)[d]	
t-3 to *t*-2	405	0.742	0.423		0.0695	*	0.0595	*	0.0745	*
t-2 to *t*–1	554	0.620	0.124		0.0824	*	0.0766	*	0.2220	
t-1 to *t*	554	1.508	0.584	s	0.0075	**	0.0017	***	0.0167	**
t to *t*+1	363	-0.288	-0.246		0.6913		0.7809		0.7847	
t+1 to *t*+2	233	0.417	0.469		0.2219		0.1151		0.0839	*
t+2 to *t*+3	147	-0.525	0.108		0.7594		0.6171		0.4345	
t-2 to *t*	554	2.128	0.996		0.0009	***	0.0002	***	0.0097	***
t-2 to *t*+1	363	1.911	1.035		0.0014	**	0.0006	***	0.0090	***
t-2 to *t*+2	233	3.183	2.437		0.0001	***	0.0000	***	0.0000	***
t-2 to *t*+3	147	3.936	2.575	s	0.0001	***	0.0001	***	0.0008	***
t-1 to *t*+1	363	1.343	0.953		0.0177	**	0.0296	**	0.0090	***
t-1 to *t*+2	233	2.230	2.597		0.0040	***	0.0001	***	0.0000	***
t-1 to *t*+3	147	3.575	3.371	s	0.0010	***	0.0002	***	0.0158	**

[a] "N" indicates total number of certified firms in the corresponding sample.
[b] AP mean and median indicate the mean and median abnormal performance.
[c] An "s" in column "sk" indicates that the absolute value of the skewness is greater than one.
[d] The *p*-values shown are those for the one-sided test of the null hypothesis of no abnormal performance, using a *t*-test, Wilcoxon signed rank test, and sign test respectively.

Note: * p < .1; ** p < .05; *** p < .01. In all cases, the hypothesis of normally distributed abnormal performance was rejected by the Shapiro-Wilk test with *p*-values below 1%, so the *t*-test is never appropriate, but reported for completeness; if the skewness is substantial the sign test is appropriate, otherwise one can use the WSR test.

Table A3: Abnormal performance in ROA; portfolio matching, by industry, ROA, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	-0.0173	0.0000		0.5161		0.4905		0.5000	
t-2 to *t*–1	554	0.8906	0.9124		0.0102	**	0.0001	***	0.0002	***
t-1 to *t*	554	1.6709	1.3656	s	0.0018	***	0.0000	***	0.0000	***
t to *t*+1	363	0.2498	0.3803		0.3197		0.0990	*	0.0944	*
t+1 to *t*+2	233	0.5664	0.3695		0.0813	*	0.0738	*	0.1624	
t+2 to *t*+3	147	0.0851	0.6468		0.4519		0.3445		0.1241	
t-2 to *t*	554	2.5615	1.6100		0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+1	363	2.8874	1.8706		0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+2	233	3.7216	1.9982		0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+3	147	4.1047	2.9681	s	0.0000	***	0.0000	***	0.0000	***
t-1 to *t*+1	363	2.3241	1.6970	s	0.0000	***	0.0000	***	0.0000	**
t-1 to *t*+2	233	2.9311	2.1526		0.0000	***	0.0000	***	0.0000	***
t-1 to *t*+3	147	3.5600	2.9978	s	0.0003	***	0.0001	***	0.0103	**

Table A4: Abnormal performance in ROA; one-to-one matching, by industry, ROA

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	-0.926	-0.772		0.9359		0.9698		0.9104	
t-2 to *t*–1	554	2.666	1.301	s	0.0000	***	0.0000	***	0.0000	***
t-1 to *t*	554	2.197	0.905		0.0005	***	0.0001	***	0.0042	***
t to *t*+1	363	0.978	0.028	s	0.0884	*	0.2114		0.3964	
t+1 to *t*+2	233	-0.585	0.171	s	0.7070		0.8539		0.3230	
t+2 to *t*+3	147	1.701	0.444		0.0750	*	0.0619	*	0.0346	**
t-2 to *t*	554	4.863	2.620		0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+1	363	5.633	2.824	s	0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+2	233	5.714	2.688	s	0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+3	147	8.976	3.751	s	0.0000	***	0.0000	***	0.0040	***
t-1 to *t*+1	363	3.424	1.364		0.0004	***	0.0002	***	0.0118	**
t-1 to *t*+2	233	3.166	2.172		0.0123	**	0.0013	***	0.0035	***
t-1 to *t*+3	147	6.965	4.604		0.0006	***	0.0001	***	0.0065	***

Table A5: Abnormal performance in ROA; portfolio matching, by industry, ROA

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	-1.338	-1.304		0.9998		1.0000		1.0000	
t-2 to *t*–1	554	2.314	2.377		0.0000	***	0.0000	***	0.0000	***
t-1 to *t*	554	1.395	1.710	s	0.0004	***	0.0000	***	0.0000	***
t to *t*+1	363	0.552	0.573	s	0.1303		0.0219	**	0.0293	**
t+1 to *t*+2	233	0.936	0.945		0.0108	**	0.0035	***	0.0179	**
t+2 to *t*+3	147	0.888	1.179		0.0328	**	0.0048	***	0.0008	***
t-2 to *t*	554	3.709	3.550	s	0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+1	363	4.577	3.934		0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+2	233	5.760	4.458		0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+3	147	7.039	5.037		0.0000	***	0.0000	***	0.0000	***
t-1 to *t*+1	363	2.438	2.543		0.0000	***	0.0000	***	0.0000	***
t-1 to *t*+2	233	3.632	3.504		0.0000	***	0.0000	***	0.0000	***
t-1 to *t*+3	147	5.280	4.353		0.0000	***	0.0000	***	0.0000	***

Table A6: Abnormal performance in ROA; one-to-one matching, by industry, ASSETS

from year	N	AP mean	AP median	sk	p-value (t-test)		p-value (WSR test)		p-value (sign test)	
t-3 to t-2	405	0.530	0.559		0.1542		0.1026		0.0896	*
t-2 to t–1	554	0.232	0.073		0.2997		0.4058		0.3353	
t-1 to t	554	0.561	0.097		0.1710		0.4231		0.4325	
t to t+1	363	1.029	0.315	s	0.0866	*	0.2375		0.3181	
t+1 to t+2	233	-0.709	0.384		0.8817		0.4644		0.2351	
t+2 to t+3	147	2.766	0.800	s	0.0025	***	0.0112	**	0.0103	**
t-2 to t	554	0.794	-0.151		0.1307		0.3626		0.7380	
t-2 to t+1	363	2.026	-0.533	s	0.0204	**	0.2535		0.7847	
t-2 to t+2	233	1.847	2.300		0.0255	**	0.0208	**	0.0654	*
t-2 to t+3	147	5.825	3.610	s	0.0001	***	0.0002	***	0.0005	***
t-1 to t+1	363	1.850	0.150	s	0.0159	**	0.2526		0.3565	
t-1 to t+2	233	1.384	1.097		0.0578	*	0.0407	**	0.0283	**
t-1 to t+3	147	5.021	2.264	s	0.0005	***	0.0026	***	0.0158	**

Table A7: Abnormal performance in ROA; portfolio matching, by industry, ASSETS

from year	N	AP mean	AP median	sk	p-value (t-test)		p-value (WSR test)		p-value (sign test)	
t-3 to t-2	405	0.8539	0.9685		0.0103	**	0.0021	***	0.0019	***
t-2 to t–1	554	0.5841	0.6719		0.0385	**	0.0006	***	0.0029	***
t-1 to t	554	0.2966	0.4386		0.2204		0.0148	**	0.0804	*
t to t+1	363	0.1412	0.1225	s	0.3735		0.3820		0.3373	
t+1 to t+2	233	0.3289	0.6346		0.1481		0.0295	**	0.0578	*
t+2 to t+3	147	0.6515	1.0701		0.0727	*	0.0204	**	0.0103	**
t-2 to t	554	0.8807	1.1045	s	0.0251	**	0.0001	***	0.0009	***
t-2 to t+1	363	0.7244	0.3369		0.0605	*	0.0353	**	0.1241	
t-2 to t+2	233	1.3506	1.1356		0.0047	***	0.0035	***	0.0179	**
t-2 to t+3	147	2.3401	1.1860		0.0005	***	0.0018	***	0.0494	**
t-1 to t+1	363	0.5884	0.4219		0.0812	*	0.0906	*	0.1469	
t-1 to t+2	233	1.0446	0.9561		0.0129	**	0.0039	***	0.0019	***
t-1 to t+3	147	2.1729	2.2921		0.0007	***	0.0007	***	0.0040	***

Table A8: Abnormal performance in ROS; one-to-one matching, by industry, ROA, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	0.266	0.024		0.2340		0.3584		0.4603	
t-2 to *t*–1	554	0.442	0.347	s	0.2113		0.0097	***	0.0306	**
t-1 to *t*	554	1.074	0.255		0.0053	***	0.0030	***	0.0252	**
t to *t*+1	363	0.201	-0.058		0.3199		0.4565		0.6036	
t+1 to *t*+2	233	0.887	0.604	s	0.0579	**	0.0910	*	0.0208	**
t+2 to *t*+3	147	-0.177	0.245		0.6121		0.3175		0.3396	
t-2 to *t*	554	1.516	0.973	s	0.0034	***	0.0001	***	0.0022	***
t-2 to *t*+1	363	2.024	0.810		0.0003	***	0.0001	***	0.0155	**
t-2 to *t*+2	233	3.343	1.792		0.0000	***	0.0000	***	0.0004	***
t-2 to *t*+3	147	4.121	2.788		0.0000	***	0.0000	***	0.0000	***
t-1 to *t*+1	363	1.161	0.498		0.0114	**	0.0081	***	0.0201	**
t-1 to *t*+2	233	2.161	1.682		0.0026	***	0.0002	***	0.0004	***
t-1 to *t*+3	147	3.275	2.069		0.0002	***	0.0000	***	0.0000	***

Table A9: Abnormal performance in ROS; portfolio matching, by industry, ROA, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	-0.6960	-0.1584	s	0.9483		0.9547		0.8277	
t-2 to *t*–1	554	0.8851	0.9911		0.0060	***	0.0000	***	0.0000	***
t-1 to *t*	554	1.4446	0.8984		0.0001	***	0.0000	***	0.0000	***
t to *t*+1	363	0.3139	0.4402		0.2145		0.0172	**	0.0118	**
t+1 to *t*+2	233	0.4563	0.1955		0.1354		0.1437		0.2773	
t+2 to *t*+3	147	0.3055	0.2454		0.2768		0.1046		0.1410	
t-2 to *t*	554	2.3298	1.3384		0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+1	363	2.6612	1.7270		0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+2	233	3.4234	2.0797	s	0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+3	147	3.9593	2.9617		0.0000	***	0.0000	***	0.0000	***
t-1 to *t*+1	363	1.9229	1.1713		0.0000	***	0.0000	***	0.0000	***
t-1 to *t*+2	233	2.5668	1.7293		0.0000	***	0.0000	***	0.0001	***
t-1 to *t*+3	147	3.1821	2.3978		0.0000	***	0.0000	***	0.0000	***

Table A10: Abnormal performance in ROS; one-to-one matching, by industry, ROA

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	-1.287	-0.662		0.9977		0.9964		0.9937	
t-2 to *t*–1	554	1.890	0.562	s	0.0030	***	0.0000	***	0.0019	***
t-1 to *t*	554	1.628	0.730		0.0011	***	0.0001	***	0.0011	***
t to *t*+1	363	1.801	0.130	s	0.0073	***	0.1694		0.2153	
t+1 to *t*+2	233	-0.730	-0.119		0.8087		0.9210		0.7227	
t+2 to *t*+3	147	2.924	0.353	s	0.0053	***	0.0168	**	0.1072	
t-2 to *t*	554	3.519	1.540		0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+1	363	5.378	2.381	s	0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+2	233	5.015	1.921	s	0.0000	***	0.0000	***	0.0001	***
t-2 to *t*+3	147	9.007	2.837	s	0.0000	***	0.0000	***	0.0001	***
t-1 to *t*+1	363	3.710	1.765	s	0.0002	***	0.0000	***	0.0000	***
t-1 to *t*+2	233	3.043	1.637		0.0043	***	0.0010	***	0.0010	***
t-1 to *t*+3	147	7.484	3.152	s	0.0003	***	0.0000	***	0.0040	***

Table A11: Abnormal performance in ROS; portfolio matching, by industry, ROA

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	-1.724	-1.327		1.0000		1.0000		1.0000	
t-2 to *t*–1	554	1.790	1.832		0.0000	***	0.0000	***	0.0000	***
t-1 to *t*	554	2.323	1.627	s	0.0000	***	0.0000	***	0.0000	***
t to *t*+1	363	0.645	0.830	s	0.1360		0.0009	***	0.0000	***
t+1 to *t*+2	233	1.271	0.801	s	0.0320	**	0.0212	**	0.0246	**
t+2 to *t*+3	147	3.606	0.697	s	0.0012	***	0.0011	***	0.0065	***
t-2 to *t*	554	4.113	2.989		0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+1	363	5.388	4.001	s	0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+2	233	7.063	4.166	s	0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+3	147	10.653	4.759	s	0.0000	***	0.0000	***	0.0000	***
t-1 to *t*+1	363	3.584	2.623	s	0.0000	***	0.0000	***	0.0000	***
t-1 to *t*+2	233	5.288	3.146	s	0.0000	***	0.0000	***	0.0000	***
t-1 to *t*+3	147	9.190	3.423	s	0.0000	***	0.0000	***	0.0000	***

Table A12: Abnormal performance in ROS; one-to-one matching, by industry, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	0.775	0.187	s	0.1495		0.2298		0.2428	
t-2 to *t*–1	554	-0.026	0.060		0.5196		0.2223		0.3049	
t-1 to *t*	554	0.367	0.119	s	0.3013		0.2056		0.2220	
t to *t*+1	363	0.807	0.319		0.0824	*	0.0973	*	0.0944	*
t+1 to *t*+2	233	-0.887	0.128		0.9721		0.7738		0.3230	
t+2 to *t*+3	147	2.107	0.730	s	0.0014	***	0.0011	***	0.0283	**
t-2 to *t*	554	0.341	0.082		0.3479		0.1715		0.3511	
t-2 to *t*+1	363	1.548	0.035		0.0512	*	0.0375	**	0.3964	
t-2 to *t*+2	233	0.592	0.755	s	0.2929		0.0133	**	0.0208	**
t-2 to *t*+3	147	4.045	2.286		0.0005	***	0.0001	***	0.0031	***
t-1 to *t*+1	363	1.619	0.351		0.0167	**	0.0352	**	0.0944	*
t-1 to *t*+2	233	0.536	1.539	s	0.2719		0.0131	**	0.0051	***
t-1 to *t*+3	147	3.459	2.204		0.0004	***	0.0001	***	0.0002	***

Table A13: Abnormal performance in ROS; portfolio matching, by industry, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	-5.7486	0.3457	s	0.9996		0.2354		0.1165	
t-2 to *t*–1	554	5.6668	0.2530	s	0.0007	***	0.0321	**	0.0939	*
t-1 to *t*	554	1.2178	0.2484	s	0.2895		0.0240	**	0.0186	**
t to *t*+1	363	0.3621	0.1261	s	0.4552		0.3401		0.1469	
t+1 to *t*+2	233	2.7453	0.0281	s	0.2446		0.4894		0.3967	
t+2 to *t*+3	147	5.1095	1.1778	s	0.0355	**	0.0000	***	0.0002	***
t-2 to *t*	554	6.8846	0.5532	s	0.0034	***	0.0139	**	0.0186	**
t-2 to *t*+1	363	4.4028	-0.0133	s	0.0754	*	0.3537		0.5418	
t-2 to *t*+2	233	3.5700	0.5232	s	0.2101		0.0760	*	0.0747	*
t-2 to *t*+3	147	5.3939	2.0015	s	0.0148	**	0.0004	***	0.0008	***
t-1 to *t*+1	363	0.2927	0.3543	s	0.4689		0.0231	**	0.0465	**
t-1 to *t*+2	233	0.1015	0.9422	s	0.4909		0.0025	***	0.0019	***
t-1 to *t*+3	147	3.7825	2.3751	s	0.0005	***	0.0000	***	0.0001	***

Table A14: Abnormal performance in Tobin's Q; one-to-one matching, by industry, ROA, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
$t-3$ to $t-2$	282	0.031	-0.002		0.3321		0.7853		0.5711	
$t-2$ to $t-1$	406	0.083	0.052		0.0973	*	0.0211	**	0.0368	**
$t-1$ to t	468	0.097	0.065		0.0315	**	0.0089	***	0.0080	***
t to $t+1$	315	-0.020	0.018		0.6295		0.4997		0.1987	
$t+1$ to $t+2$	200	-0.076	-0.003		0.8763		0.4930		0.7146	
$t+2$ to $t+3$	126	-0.122	-0.067		0.9792		0.9606		0.9634	
$t-2$ to t	405	0.186	0.179		0.0069	***	0.0002	***	0.0000	***
$t-2$ to $t+1$	256	0.167	0.209		0.0248	**	0.0011	***	0.0003	***
$t-2$ to $t+2$	160	0.212	0.200		0.0375	**	0.0015	***	0.0034	***
$t-2$ to $t+3$	102	0.195	0.179		0.0436	**	0.0308	**	0.0364	**
$t-1$ to $t+1$	298	0.057	0.057		0.2176		0.1279		0.0656	*
$t-1$ to $t+2$	182	0.061	0.090	s	0.2870		0.0208	**	0.0265	**
$t-1$ to $t+3$	116	0.149	0.164		0.0738	*	0.0221	**	0.0124	**

Table A15: Abnormal performance in Tobin's Q; portfolio matching, by industry, ROA, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
$t-3$ to $t-2$	334	-0.0331	-0.0015		0.7258		0.7743		0.5867	
$t-2$ to $t-1$	463	0.0717	0.0455		0.0769	*	0.0253	**	0.0113	**
$t-1$ to t	501	0.0952	0.0504		0.0153	**	0.0038	***	0.0973	*
t to $t+1$	335	-0.0201	0.0265		0.6508		0.3838		0.2385	
$t+1$ to $t+2$	211	-0.0841	-0.0180		0.9453		0.7430		0.7327	
$t+2$ to $t+3$	132	-0.0454	-0.0315		0.7789		0.8741		0.8088	
$t-2$ to t	462	0.1608	0.1703		0.0033	***	0.0001	***	0.0001	***
$t-2$ to $t+1$	299	0.1796	0.1809		0.0025	***	0.0001	***	0.0001	***
$t-2$ to $t+2$	184	0.1096	0.1373		0.1189		0.0109	**	0.0059	***
$t-2$ to $t+3$	118	0.1933	0.1554		0.0150	**	0.0088	***	0.0977	*
$t-1$ to $t+1$	324	0.0886	0.0765		0.0641	*	0.0326	**	0.0475	**
$t-1$ to $t+2$	198	0.0285	0.0388		0.3697		0.1053		0.1271	
$t-1$ to $t+3$	124	0.1442	0.0415		0.0538	*	0.0739	*	0.2354	

Table A16: Abnormal performance in Tobin's Q; one-to-one matching, by industry, ROA

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	286	-0.005	-0.025	s	0.5230		0.9438		0.7797	
t-2 to *t*–1	392	0.092	0.080		0.0947	*	0.0114	**	0.0075	***
t-1 to *t*	464	0.118	0.107		0.0142	**	0.0011	***	0.0046	***
t to *t*+1	322	-0.008	-0.015		0.5510		0.6949		0.6311	
t+1 to *t*+2	208	-0.084	0.000		0.8390		0.6055		0.5553	
t+2 to *t*+3	130	0.012	-0.044		0.4547		0.6240		0.8547	
t-2 to *t*	391	0.232	0.151		0.0024	***	0.0002	***	0.0049	***
t-2 to *t*+1	248	0.349	0.265		0.0002	***	0.0000	***	0.0001	***
t-2 to *t*+2	166	0.336	0.249		0.0088	***	0.0008	***	0.0015	***
t-2 to *t*+3	105	0.478	0.286		0.0007	***	0.0007	***	0.0310	**
t-1 to *t*+1	300	0.218	0.151		0.0031	***	0.0005	***	0.0013	***
t-1 to *t*+2	189	0.127	0.109		0.1613		0.0288	**	0.0243	**
t-1 to *t*+3	116	0.307	0.244		0.0085	***	0.0102	**	0.0309	**

Table A17: Abnormal performance in Tobin's Q; portfolio matching, by industry, ROA

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	366	-0.014	0.011		0.6086		0.4122		0.1871	
t-2 to *t*–1	496	0.041	0.005		0.2010		0.1201		0.4464	
t-1 to *t*	527	0.120	0.075		0.0009	***	0.0001	***	0.0011	***
t to *t*+1	350	0.013	0.057		0.3948		0.0518	*	0.0080	***
t+1 to *t*+2	224	-0.027	-0.019		0.6910		0.7039		0.7261	
t+2 to *t*+3	140	0.088	0.010		0.0650	*	0.1204		0.4663	
t-2 to *t*	496	0.164	0.072		0.0026	***	0.0000	***	0.0013	***
t-2 to *t*+1	322	0.239	0.199		0.0001	***	0.0000	***	0.0000	***
t-2 to *t*+2	204	0.233	0.199		0.0046	***	0.0007	***	0.0002	***
t-2 to *t*+3	132	0.310	0.113		0.0003	***	0.0004	***	0.0224	**
t-1 to *t*+1	343	0.136	0.089		0.0036	***	0.0008	***	0.0064	***
t-1 to *t*+2	216	0.192	0.157		0.0061	***	0.0010	***	0.0330	**
t-1 to *t*+3	136	0.315	0.234		0.0000	***	0.0000	***	0.0001	***

Table A18: Abnormal performance in Tobin's Q; one-to-one matching, by industry, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	293	0.100	0.000		0.0613	*	0.2097		0.5000	
t-2 to *t*–1	413	0.009	0.042		0.4399		0.0755	*	0.1504	
t-1 to *t*	466	0.093	0.030		0.0430	**	0.0404	**	0.0574	*
t to *t*+1	314	-0.090	-0.076		0.9196		0.9432		0.9551	
t+1 to *t*+2	204	-0.016	0.004		0.5955		0.5281		0.5000	
t+2 to *t*+3	131	-0.080	-0.004		0.8690		0.6439		0.6694	
t-2 to *t*	409	0.134	0.125		0.0292	**	0.0017	***	0.0032	***
t-2 to *t*+1	263	0.131	0.103		0.0630	*	0.0598	*	0.1202	
t-2 to *t*+2	175	0.169	0.191		0.0663	*	0.0205	**	0.0748	*
t-2 to *t*+3	119	0.147	0.215		0.1050		0.0307	**	0.0169	**
t-1 to *t*+1	297	0.042	0.000		0.3109		0.3487		0.5692	
t-1 to *t*+2	188	0.081	0.109		0.2187		0.1107		0.0717	*
t-1 to *t*+3	126	0.091	0.087		0.2141		0.1006		0.0535	*

Table A19: Abnormal performance in Tobin's Q; portfolio matching, by industry, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	368	0.0469	0.0555		0.1435		0.0229	**	0.1152	
t-2 to *t*–1	500	0.0368	0.0506		0.1851		0.0021	***	0.0069	***
t-1 to *t*	529	0.0616	0.0639		0.0411	**	0.0022	***	0.0020	***
t to *t*+1	351	-0.0669	0.0141	s	0.9410		0.6624		0.2275	
t+1 to *t*+2	225	-0.0448	-0.0034		0.8337		0.6939		0.5530	
t+2 to *t*+3	141	-0.0467	-0.0285		0.8343		0.8566		0.9354	
t-2 to *t*	500	0.0967	0.0911		0.0229	**	0.0001	***	0.0001	***
t-2 to *t*+1	324	0.0575	0.0965		0.1546		0.0052	***	0.0062	***
t-2 to *t*+2	206	0.0473	0.0924	s	0.2927		0.0216	**	0.0298	**
t-2 to *t*+3	133	0.0934	0.0390		0.1219		0.0428	**	0.2240	
t-1 to *t*+1	344	-0.0077	0.0254		0.5620		0.3089		0.2766	
t-1 to *t*+2	217	-0.0181	0.0191	s	0.5939		0.4427		0.2487	
t-1 to *t*+3	137	0.0619	0.0793		0.2005		0.1151		0.0619	*

Table A20: Abnormal performance in COGS/SALES; one-to-one matching, by industry, ROA, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	-0.432	-0.217	s	0.1155		0.1140		0.0970	*
t-2 to *t*–1	554	-0.215	-0.398	s	0.2566		0.0191	**	0.0067	***
t-1 to *t*	554	-0.812	-0.242	s	0.0055	***	0.0253	**	0.0625	*
t to *t*+1	363	-0.240	-0.299		0.2011		0.1052		0.0413	**
t+1 to *t*+2	233	-0.848	-0.404	s	0.0367	**	0.1380		0.0654	*
t+2 to *t*+3	147	0.349	0.444		0.7561		0.7076		0.8928	
t-2 to *t*	554	-1.027	-0.533		0.0037	***	0.0088	***	0.0107	**
t-2 to *t*+1	363	-1.328	-1.143		0.0024	***	0.0006	***	0.0067	***
t-2 to *t*+2	233	-2.503	-1.559		0.0002	***	0.0000	***	0.0000	***
t-2 to *t*+3	147	-3.283	-2.129		0.0000	***	0.0000	***	0.0001	***
t-1 to *t*+1	363	-0.890	-0.592		0.0135	**	0.0077	***	0.0779	*
t-1 to *t*+2	233	-1.803	-1.163		0.0026	***	0.0010	***	0.0006	***
t-1 to *t*+3	147	-2.348	-1.460		0.0014	***	0.0006	***	0.0065	***

Table A21: Abnormal performance in COGS/SALES; portfolio matching, by industry, ROA, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	0.0391	0.0764		0.5594		0.7041		0.7079	
t-2 to *t*–1	554	-0.3569	-0.6624	s	0.0733	*	0.0001	***	0.0000	***
t-1 to *t*	554	-0.8556	-0.4523		0.0016	***	0.0022	***	0.0108	**
t to *t*+1	363	-0.1659	-0.4132		0.2711		0.0290	**	0.0201	**
t+1 to *t*+2	233	-0.6088	-0.2057		0.0358	**	0.0990	*	0.2773	
t+2 to *t*+3	147	0.1107	-0.0534		0.6149		0.5884		0.4670	
t-2 to *t*	554	-1.2125	-0.9509		0.0003	***	0.0000	***	0.0000	***
t-2 to *t*+1	363	-1.5617	-1.6444		0.0001	***	0.0000	***	0.0000	***
t-2 to *t*+2	233	-2.4130	-2.1055		0.0000	***	0.0000	***	0.0000	***
t-2 to *t*+3	147	-2.8740	-2.6741		0.0000	***	0.0000	***	0.0000	***
t-1 to *t*+1	363	-1.2215	-0.9188		0.0005	***	0.0002	***	0.0090	***
t-1 to *t*+2	233	-1.8787	-1.6131		0.0001	***	0.0001	***	0.0010	***
t-1 to *t*+3	147	-2.1623	-1.9328		0.0008	***	0.0001	***	0.0014	***

Table A22: Abnormal performance in COGS/SALES; one-to-one matching, by industry, ROA

from year	N	AP mean	AP median	sk	p-value (t-test)		p-value (WSR test)		p-value (sign test)	
t-3 to t-2	405	-0.186	0.000	s	0.3325		0.5721		0.5000	
t-2 to t–1	554	-0.909	-0.590	s	0.0269	**	0.0027	***	0.0002	***
t-1 to t	554	-0.678	-0.407		0.0436	**	0.0036	***	0.0204	**
t to t+1	363	-0.934	-0.733	s	0.0066	***	0.0095	***	0.0026	***
t+1 to t+2	233	0.656	-0.015		0.8562		0.5373		0.4738	
t+2 to t+3	147	-1.963	0.000	s	0.0365	**	0.2369		0.5330	
t-2 to t	554	-1.588	-1.188		0.0001	***	0.0001	***	0.0000	***
t-2 to t+1	363	-2.947	-1.935		0.0000	***	0.0000	***	0.0000	***
t-2 to t+2	233	-2.228	-1.491		0.0018	***	0.0002	***	0.0000	***
t-2 to t+3	147	-4.433	-1.950	s	0.0009	***	0.0008	***	0.0023	***
t-1 to t+1	363	-2.170	-1.418		0.0000	***	0.0000	***	0.0001	***
t-1 to t+2	233	-1.370	-1.379		0.0351	**	0.0107	**	0.0023	***
t-1 to t+3	147	-3.242	-1.846	s	0.0105	**	0.0083	***	0.0494	**

Table A23: Abnormal performance in COGS/SALES; portfolio matching, by industry, ROA

from year	N	AP mean	AP median	sk	p-value (t-test)		p-value (WSR test)		p-value (sign test)	
t-3 to t-2	405	0.603	0.546		0.9926		0.9992		0.9995	
t-2 to t–1	554	-0.662	-0.847	s	0.0007	***	0.0000	***	0.0000	***
t-1 to t	554	-1.130	-0.760	s	0.0002	***	0.0000	***	0.0000	***
t to t+1	363	0.243	-0.390	s	0.7027		0.0118	**	0.0230	**
t+1 to t+2	233	-0.555	-0.305		0.0181	**	0.0228	**	0.0747	*
t+2 to t+3	147	-0.049	0.323		0.4431		0.4973		0.6388	
t-2 to t	554	-1.792	-1.253	s	0.0000	***	0.0000	***	0.0000	***
t-2 to t+1	363	-2.141	-2.248		0.0000	***	0.0000	***	0.0000	***
t-2 to t+2	233	-2.866	-2.900		0.0000	***	0.0000	***	0.0000	***
t-2 to t+3	147	-3.256	-2.619		0.0000	***	0.0000	***	0.0000	***
t-1 to t+1	363	-1.370	-1.494		0.0000	***	0.0000	***	0.0000	***
t-1 to t+2	233	-2.034	-1.979		0.0000	***	0.0000	***	0.0000	***
t-1 to t+3	147	-2.380	-2.431		0.0000	***	0.0000	***	0.0000	***

Table A24: Abnormal performance in COGS/SALES; one-to-one matching, by industry, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	-0.002	-0.182	s	0.4978		0.1666		0.0970	*
t-2 to *t*–1	554	-0.511	-0.119	s	0.1078		0.1061		0.1971	
t-1 to *t*	554	-0.450	-0.044		0.1210		0.1231		0.2755	
t to *t*+1	363	-0.347	-0.178	s	0.1665		0.1874		0.1858	
t+1 to *t*+2	233	0.355	-0.367	s	0.7667		0.2119		0.0503	*
t+2 to *t*+3	147	-1.957	-0.872	s	0.0003	***	0.0002	***	0.0050	***
t-2 to *t*	554	-0.961	-0.197		0.0154	**	0.0313	**	0.1340	
t-2 to *t*+1	363	-1.233	-0.701		0.0210	**	0.0274	**	0.1348	
t-2 to *t*+2	233	-1.311	-1.171		0.0816	*	0.0044	***	0.0075	***
t-2 to *t*+3	147	-4.023	-3.021	s	0.0027	***	0.0000	***	0.0001	***
t-1 to *t*+1	363	-0.928	-0.218		0.0345	**	0.0493	**	0.2816	
t-1 to *t*+2	233	-0.802	-0.761	s	0.1390		0.0102	**	0.0503	*
t-1 to *t*+3	147	-2.804	-2.018	s	0.0071	***	0.0000	***	0.0008	***

Table A25: Abnormal performance in COGS/SALES; portfolio matching, by industry, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	4.9366	-0.0275	s	0.9995		0.7652		0.5000	
t-2 to *t*–1	554	-5.3574	-0.3411	s	0.0005	***	0.1635		0.0338	***
t-1 to *t*	554	0.0436	-0.1375		0.5091		0.0390	**	0.1642	
t to *t*+1	363	3.3747	0.0087	s	0.9408		0.5321		0.5418	
t+1 to *t*+2	233	-0.4186	-0.0530	s	0.3906		0.4994		0.5000	
t+2 to *t*+3	147	-4.0802	-0.3240	s	0.0554	*	0.0173	**	0.0346	*
t-2 to *t*	554	-5.3130	-0.2294	s	0.0027	***	0.1174		0.0939	***
t-2 to *t*+1	363	-0.6033	-0.3650	s	0.3025		0.1359		0.2005	
t-2 to *t*+2	233	-0.6871	-0.5967	s	0.3265		0.0439	**	0.0332	
t-2 to *t*+3	147	-4.3905	-1.7778	s	0.0384	**	0.0083	***	0.0237	**
t-1 to *t*+1	363	4.0358	-0.3398	s	0.9488		0.0913	*	0.0861	
t-1 to *t*+2	233	3.6174	-0.6284	s	0.9301		0.0624	*	0.0246	
t-1 to *t*+3	147	-2.2711	-0.9392	s	0.0104	**	0.0030	***	0.0934	**

Table A26: Abnormal relative SALES growth; one-to-one matching, by industry, ROA, ASSETS

from year	N	AP mean	AP median	sk	p-value (t-test)		p-value (WSR test)		p-value (sign test)	
t-3 to t-2	405	-0.023	-0.011		0.8829		0.9858		0.8847	
t-2 to t–1	554	0.010	-0.018		0.2976		0.8068		0.9427	
t-1 to t	554	0.037	0.014		0.0049	***	0.0119	**	0.0625	*
t to t+1	363	0.049	0.015		0.0071	***	0.0082	***	0.0460	**
t+1 to t+2	233	0.006	0.019		0.4056		0.1911		0.1785	
t+2 to t+3	147	0.044	0.034		0.0225	**	0.0347	**	0.0673	*
t-2 to t	554	0.070	0.000		0.0303	**	0.2785		0.5000	
t-2 to t+1	363	0.091	0.031		0.0965	*	0.0301	**	0.1342	
t-2 to t+2	233	0.118	0.016		0.1038		0.1205		0.3466	
t-2 to t+3	147	0.220	0.049	s	0.1099		0.1585		0.2533	
t-1 to t+1	363	0.090	0.028		0.0099	***	0.0018	***	0.0938	*
t-1 to t+2	233	0.116	0.049		0.0291	**	0.0280	**	0.1462	
t-1 to t+3	147	0.236	0.116	s	0.0192	**	0.0253	**	0.0919	*

Note: "Abnormal relative sales growth" is defined by comparing $\frac{SALES_t - SALES_{t-1}}{SALES_{t-1}}$ of certified firms with that of the control firms.

Table A27: Abnormal performance in SALES; portfolio matching, by industry, ROA, ASSETS

from year	N	AP mean	AP median	sk	p-value (t-test)		p-value (WSR test)		p-value (sign test)
t-3 to t-2	405	-0.0675	-0.0415	s	0.9956		1.0000		0.9999
t-2 to t–1	554	0.0031	-0.0232	s	0.4233		0.9936		0.9998
t-1 to t	554	0.0351	0.0064		0.0053	***	0.0131	**	0.1748
t to t+1	363	0.0532	0.0042	s	0.0005	***	0.0555	*	0.2816
t+1 to t+2	233	0.0144	0.0076	s	0.2416		0.4510		0.2773
t+2 to t+3	147	0.0501	0.0300		0.0090	***	0.0210	**	0.1072
t-2 to t	554	0.0622	-0.0222	s	0.0323	**	0.7407		0.8656
t-2 to t+1	363	0.1252	0.0000	s	0.0061	***	0.2381		0.5210
t-2 to t+2	233	0.1460	-0.0034	s	0.0479	**	0.4102		0.5780
t-2 to t+3	147	0.2857	0.0128	s	0.0606	*	0.3406		0.4020
t-1 to t+1	363	0.0988	0.0130		0.0007	***	0.0116	**	0.3181
t-1 to t+2	233	0.1461	0.0279	s	0.0043	***	0.0690	*	0.3714
t-1 to t+3	147	0.2733	0.0685	s	0.0092	***	0.0544	*	0.2813

Table A28: Abnormal performance in SALES; one-to-one matching, by industry, ROA

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	-0.069	-0.030		0.9979		0.9992		0.9993	
t-2 to *t*–1	554	0.007	-0.003		0.3554		0.6127		0.8147	
t-1 to *t*	554	0.033	0.035		0.0248	**	0.0065	***	0.0041	***
t to *t*+1	363	0.056	0.022		0.0028	***	0.0133	**	0.1462	
t+1 to *t*+2	233	0.021	0.023	s	0.1979		0.1398		0.1181	
t+2 to *t*+3	147	0.064	0.034		0.0055	***	0.0091	***	0.0919	*
t-2 to *t*	554	0.055	0.026		0.0898	*	0.0697	*	0.0737	*
t-2 to *t*+1	363	0.092	0.019		0.0815	*	0.0425	**	0.2146	
t-2 to *t*+2	233	0.165	0.050		0.0505	*	0.0914	*	0.1181	
t-2 to *t*+3	147	0.345	0.164	s	0.0421	**	0.0615	*	0.0919	*
t-1 to *t*+1	363	0.095	0.037		0.0048	***	0.0109	**	0.0631	*
t-1 to *t*+2	233	0.145	0.091		0.0144	**	0.0257	**	0.0571	*
t-1 to *t*+3	147	0.319	0.151	s	0.0067	***	0.0070	***	0.0229	**

Table A29: Abnormal performance in SALES; portfolio matching, by industry, ROA

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	-0.066	-0.081		1.0000		1.0000		1.0000	
t-2 to *t*–1	554	-0.001	-0.048	s	0.5398		1.0000		1.0000	
t-1 to *t*	554	0.005	-0.019		0.3427		0.9658		0.9879	
t to *t*+1	363	0.009	-0.018	s	0.3565		0.7600		0.9424	
t+1 to *t*+2	233	0.017	-0.009	s	0.1750		0.6354		0.7841	
t+2 to *t*+3	147	0.018	0.012		0.1667		0.1848		0.2048	
t-2 to *t*	554	0.013	-0.116	s	0.3393		1.0000		1.0000	
t-2 to *t*+1	363	0.026	-0.161	s	0.2953		0.9997		1.0000	
t-2 to *t*+2	233	0.045	-0.187	s	0.3011		0.9992		1.0000	
t-2 to *t*+3	147	0.185	-0.225	s	0.1567		0.9874		0.9976	
t-1 to *t*+1	363	0.036	-0.044	s	0.1123		0.9412		0.9984	
t-1 to *t*+2	233	0.088	-0.091	s	0.0544	*	0.8571		0.9957	
t-1 to *t*+3	147	0.203	-0.064	s	0.0407	**	0.6104		0.8759	

Table A30: Abnormal performance in SALES; one-to-one matching, by industry, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	-0.221	0.020	s	0.9701		0.3442		0.0970	*
t-2 to *t*–1	554	-0.012	0.000		0.7435		0.4963		0.4830	
t-1 to *t*	554	0.026	0.015		0.0600	*	0.0242	**	0.0737	*
t to *t*+1	363	0.062	0.036	s	0.0171	**	0.0001	***	0.0022	***
t+1 to *t*+2	233	0.026	0.023		0.1299		0.1615		0.1181	
t+2 to *t*+3	147	0.045	0.030		0.0327	**	0.0412	**	0.0673	*
t-2 to *t*	554	0.023	-0.001		0.2860		0.2716		0.6009	
t-2 to *t*+1	363	0.070	0.012		0.1588		0.0717	*	0.2146	
t-2 to *t*+2	233	0.118	0.026		0.1380		0.0781	*	0.2149	
t-2 to *t*+3	147	0.243	0.094		0.1609		0.0355	**	0.1224	
t-1 to *t*+1	363	0.114	0.037		0.0017	***	0.0019	***	0.0255	**
t-1 to *t*+2	233	0.196	0.081		0.0014	***	0.0045	***	0.0241	**
t-1 to *t*+3	147	0.339	0.121	s	0.0076	***	0.0069	***	0.0229	**

Table A31: Abnormal performance in SALES; portfolio matching, by industry, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	-0.0831	-0.0630		1.0000		1.0000		1.0000	
t-2 to *t*–1	554	-0.0329	-0.0388		0.9835		1.0000		1.0000	
t-1 to *t*	554	0.0069	-0.0139		0.3035		0.7622		0.9513	
t to *t*+1	363	0.0243	-0.0134		0.0878	*	0.6041		0.8961	
t+1 to *t*+2	233	0.0154	-0.0005	s	0.1972		0.4762		0.5521	
t+2 to *t*+3	147	0.0066	0.0018		0.3627		0.5224		0.4345	
t-2 to *t*	554	-0.0290	-0.0779		0.8089		1.0000		1.0000	
t-2 to *t*+1	363	0.0392	-0.0912	s	0.2036		0.9988		0.9992	
t-2 to *t*+2	233	0.0760	-0.0771	s	0.1784		0.9796		0.9937	
t-2 to *t*+3	147	0.1572	-0.0844	s	0.1856		0.9698		0.9506	
t-1 to *t*+1	363	0.0556	-0.0307	s	0.0300	**	0.6346		0.9535	
t-1 to *t*+2	233	0.0876	-0.0301	s	0.0554	*	0.5612		0.8205	
t-1 to *t*+3	147	0.1753	0.0037	s	0.0645	*	0.6945		0.5000	

Table A32: Abnormal performance in SALES/ASSETS; one-to-one matching, by industry, ROA, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	2.468	0.891		0.0765	*	0.1579		0.1850	
t-2 to *t*–1	554	-2.511	-0.947		0.9648		0.8630		0.8463	
t-1 to *t*	554	3.486	3.472		0.0039	***	0.0004	***	0.0008	***
t to *t*+1	363	-1.506	-0.863		0.8252		0.8400		0.9221	
t+1 to *t*+2	233	-3.674	-0.555		0.9672		0.7120		0.6770	
t+2 to *t*+3	147	-4.926	-2.601		0.9956		0.9943		0.9717	
t-2 to *t*	554	0.975	1.097		0.2636		0.1619		0.1344	
t-2 to *t*+1	363	-0.500	0.250		0.5935		0.4675		0.3369	
t-2 to *t*+2	233	-2.465	0.004		0.7836		0.4360		0.4738	
t-2 to *t*+3	147	-6.796	-3.309	s	0.9436		0.8368		0.7187	
t-1 to *t*+1	363	2.152	2.156		0.1256		0.1042		0.0413	**
t-1 to *t*+2	233	-1.198	2.428		0.6666		0.2602		0.3230	
t-1 to *t*+3	147	-1.833	-2.469		0.6967		0.4527		0.7187	

Table A33: Abnormal performance in SALES/ASSETS; portfolio matching, by industry, ROA, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	0.8312	1.0641		0.2623		0.0777	*	0.1262	
t-2 to *t*–1	554	-1.2268	0.9881		0.8632		0.6111		0.2220	
t-1 to *t*	554	1.7222	2.8131		0.0568	*	0.0018	***	0.0003	***
t to *t*+1	363	-0.5484	-0.6255		0.6564		0.7199		0.8410	
t+1 to *t*+2	233	-2.9175	-0.3360	s	0.9744		0.8315		0.6286	
t+2 to *t*+3	147	-0.9038	-0.5098		0.7028		0.8129		0.6604	
t-2 to *t*	554	0.4954	2.1440		0.3497		0.0612	*	0.0135	**
t-2 to *t*+1	363	-1.0356	-0.7740		0.7226		0.6292		0.6819	
t-2 to *t*+2	233	-2.9846	-0.2187		0.8938		0.7709		0.6770	
t-2 to *t*+3	147	-2.1534	0.1846		0.7462		0.5846		0.4670	
t-1 to *t*+1	363	1.6600	1.4819		0.1554		0.0784	*	0.0637	*
t-1 to *t*+2	233	-0.6950	2.1919		0.6239		0.3725		0.2773	
t-1 to *t*+3	147	1.9742	0.7686		0.2392		0.1729		0.3396	

Table A34: Abnormal performance in SALES/ASSETS; one-to-one matching, by industry, ROA

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to t-2	405	3.029	-0.754		0.0783	*	0.4586		0.8634	
t-2 to t–1	554	1.234	0.662		0.2232		0.1180		0.1537	
t-1 to t	554	1.604	2.995		0.1401		0.0268	**	0.0370	**
t to t+1	363	-0.559	-1.307		0.6156		0.7301		0.8142	
t+1 to t+2	233	-1.682	0.453		0.7981		0.4019		0.3230	
t+2 to t+3	147	2.628	1.649		0.1616		0.3045		0.1410	
t-2 to t	554	2.838	3.112		0.0640	*	0.0189	**	0.0068	***
t-2 to t+1	363	0.992	1.474		0.3615		0.3179		0.1999	
t-2 to t+2	233	0.986	1.944		0.3902		0.1901		0.2773	
t-2 to t+3	147	5.956	7.630		0.1137		0.0625	*	0.0578	*
t-1 to t+1	363	0.767	0.513		0.3833		0.4293		0.2472	
t-1 to t+2	233	0.705	1.679		0.4163		0.2384		0.2773	
t-1 to t+3	147	9.552	5.517		0.0198	**	0.0225	**	0.1072	

Table A35: Abnormal performance in SALES/ASSETS; portfolio matching, by industry, ROA

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)		*p*-value (WSR test)		*p*-value (sign test)	
t-3 to t-2	405	0.932	0.409		0.2253		0.1009		0.3455	
t-2 to t–1	554	3.314	4.315		0.0017	***	0.0000	***	0.0000	***
t-1 to t	554	1.653	2.910		0.0521	*	0.0007	***	0.0004	***
t to t+1	363	-0.569	1.331		0.6718		0.2887		0.1469	
t+1 to t+2	233	-0.859	1.174	s	0.7161		0.1148		0.2159	
t+2 to t+3	147	0.752	1.444		0.3054		0.0819	*	0.2548	
t-2 to t	554	4.967	5.921		0.0000	***	0.0000	***	0.0000	***
t-2 to t+1	363	2.760	6.175		0.0608	*	0.0004	***	0.0000	***
t-2 to t+2	233	3.517	5.117		0.0622	*	0.0009	***	0.0008	***
t-2 to t+3	147	4.372	6.086		0.0609	*	0.0056	***	0.0346	**
t-1 to t+1	363	0.973	3.633		0.2643		0.0470	**	0.0078	***
t-1 to t+2	233	1.740	4.554		0.2041		0.0124	**	0.0001	***
t-1 to t+3	147	5.074	5.391		0.0166	**	0.0070	***	0.0065	***

Table A36: Abnormal performance in SALES/ASSETS; one-to-one matching, by industry, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)	*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	-0.583	-0.280		0.6413	0.6338		0.7250	
t-2 to *t*–1	554	-3.582	-2.187		0.9967	0.9974		0.9865	
t-1 to *t*	554	-0.528	0.093		0.6652	0.3785		0.4325	
t to *t*+1	363	-0.270	-0.117		0.5643	0.7922		0.6036	
t+1 to *t*+2	233	-2.130	2.302		0.8464	0.2960		0.0654	*
t+2 to *t*+3	147	-2.938	-1.565		0.9309	0.8849		0.8928	
t-2 to *t*	554	-4.110	-1.501		0.9943	0.9954		0.9371	
t-2 to *t*+1	363	-6.772	-7.046		0.9970	0.9997		0.9996	
t-2 to *t*+2	233	-8.074	-4.987		0.9935	0.9801		0.8939	
t-2 to *t*+3	147	-7.175	-2.828		0.9731	0.9311		0.8187	
t-1 to *t*+1	363	-2.048	-3.927		0.8448	0.9574		0.9742	
t-1 to *t*+2	233	-3.591	-2.103		0.8858	0.7464		0.8678	
t-1 to *t*+3	147	-3.734	-1.892		0.8626	0.7175		0.7718	

Table A37: Abnormal performance in SALES/ASSETS; portfolio matching, by industry, ASSETS

from year	N	AP mean	AP median	sk	*p*-value (*t*-test)	*p*-value (WSR test)		*p*-value (sign test)	
t-3 to *t*-2	405	0.1334	1.1654		0.4534	0.0824	*	0.0294	**
t-2 to *t*–1	554	-2.7115	-0.4504		0.9962	0.8947		0.6489	
t-1 to *t*	554	-1.0802	0.4945		0.8760	0.4238		0.2351	
t to *t*+1	363	-1.9551	-0.8762		0.9479	0.8800		0.8531	
t+1 to *t*+2	233	-1.1704	0.5277	s	0.7897	0.2206		0.3002	
t+2 to *t*+3	147	-1.7105	-1.4486		0.8861	0.8627		0.9654	
t-2 to *t*	554	-3.7917	-1.3160		0.9995	0.9840		0.9593	
t-2 to *t*+1	363	-7.7610	-4.1925		1.0000	1.0000		0.9977	
t-2 to *t*+2	233	-7.7112	-3.8157	s	0.9950	0.9982		0.9957	
t-2 to *t*+3	147	-5.7206	-2.7800		0.9797	0.9694		0.9654	
t-1 to *t*+1	363	-3.1952	-2.8439		0.9859	0.9913		0.9942	
t-1 to *t*+2	233	-3.9580	-1.6063		0.9674	0.6008		0.7438	
t-1 to *t*+3	147	-0.9868	-0.4278		0.6612	0.6794		0.6896	

Table A38: Significance of abnormal performance in ROA under all 6 matching criteria

		industry, ROA, ASSETS				industry, ROA				industry, ASSETS			
		one-to-one		portfolio		one-to-one		portfolio		one-to-one		portfolio	
from year	N[a]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]
t-3 to *t*-2	405	*	*								*	***	***
t-2 to *t*–1	554	*		***	***	***	***	***	***			***	***
t-1 to *t*	554	***	**	***	***	***	***	***	***			**	*
t to *t*+1	363			*	*			**	**				
t+1 to *t*+2	233		*	*				***	**			**	*
t+2 to *t*+3	147					*	**	***	***	**	**	**	**
t-2 to *t*	554	***	***	***	***	***	***	***	***			***	***
t-2 to *t*+1	363	***	***	***	***	***	***	***	***			**	
t-2 to *t*+2	233	***	***	***	***	***	***	***	***	**	*	***	**
t-2 to *t*+3	147	***	***	***	***	***	***	***	***	***	***	***	**
t-1 to *t*+1	363	**	***	***	***	***	**	***	***			*	
t-1 to *t*+2	233	***	***	***	***	***	***	***	***	**	**	***	***
t-1 to *t*+3	147	***	**	***	**	***	***	***	***	***	**	***	***

[a] "N" indicates total number of certified firms in the corresponding sample.
[b] The significance levels shown are those for the one-sided test of the null hypothesis of no abnormal performance, using the Wilcoxon signed rank test and sign test respectively.

Note: * p < .1; ** p < .05; *** p < .01.

Table A39: Significance of abnormal performance in ROS under all 6 matching criteria

		industry, ROA, ASSETS				industry, ROA				industry, ASSETS			
		one-to-one		portfolio		one-to-one		portfolio		one-to-one		portfolio	
from year	N[a]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]
t-3 to *t*-2	405												
t-2 to *t*–1	554	***	**	***	***	***	***	***	***			**	*
t-1 to *t*	554	***	**	***	***	***	***	***	***			**	**
t to *t*+1	363			**	**			***	***	*	*		
t+1 to *t*+2	233	*	**					**	**				
t+2 to *t*+3	147					**		***	***	***	**	***	***
t-2 to *t*	554	***	***	***	***	***	***	***	***			**	**
t-2 to *t*+1	363	***	**	***	***	***	***	***	***	**			
t-2 to *t*+2	233	***	***	***	***	***	***	***	***	**	**	*	*
t-2 to *t*+3	147	***	***	***	***	***	***	***	***	***	***	***	***
t-1 to *t*+1	363	***	**	***	***	***	***	***	***	**	*	**	**
t-1 to *t*+2	233	***	***	***	***	***	***	***	***	**	***	***	***
t-1 to *t*+3	147	***	***	***	***	***	***	***	***	***	***	***	***

[a] "N" indicates total number of certified firms in the corresponding sample.
[b] The significance levels shown are those for the one-sided test of the null hypothesis of no abnormal performance, using the Wilcoxon signed rank test and sign test respectively.

Note: * p < .1; ** p < .05; *** p < .01.

Table A40: Significance of abnormal performance in Tobin's Q under all 6 matching criteria

		industry, ROA, ASSETS				industry, ROA				industry, ASSETS			
		one-to-one		portfolio		one-to-one		portfolio		one-to-one		portfolio	
from year	N[a]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]
t-3 to t-2	varies across matching methods											**	
t-2 to t–1		**	**	**	**	**	***			*		***	***
t-1 to t		***	***	***	*	***	***	***	***	**	*	***	***
t to t+1								*	***				
t+1 to t+2													
t+2 to t+3													
t-2 to t		***	***	***	***	***	***	***	***	***	***	***	***
t-2 to t+1		***	***	***	***	***	***	***	***	*		***	***
t-2 to t+2		***	***	**	***	***	***	***	***	**	*	**	**
t-2 to t+3		**	**	***	*	***	**	***	**	**	**	**	
t-1 to t+1			*	**	**	***	***	***	***				
t-1 to t+2		**	**			**	**	***	**		*		
t-1 to t+3		**	**	*		**	**	***	***		*		*

[a] "N" indicates total number of certified firms in the corresponding sample.
[b] The significance levels shown are those for the one-sided test of the null hypothesis of no abnormal performance, using the Wilcoxon signed rank test and sign test respectively.

Note: * p < .1; ** p < .05; *** p < .01.

Table A41: Significance of abnormal performance in COGS/SALES under all 6 matching criteria

		industry, ROA, ASSETS				industry, ROA				industry, ASSETS			
		one-to-one		portfolio		one-to-one		portfolio		one-to-one		portfolio	
from year	N[a]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]
t-3 to t-2	405		*								*		
t-2 to t–1	554	**	***	***	***	***	***	***	***				**
t-1 to t	554	**	*	***	**	***	**	***	***			**	
t to t+1	363		**	**	**	***	***	**	**				
t+1 to t+2	233		*	*				**	*		*		
t+2 to t+3	147									***	***	**	**
t-2 to t	554	***	**	***	***	***	***	***	***	**			*
t-2 to t+1	363	***	***	***	***	***	***	***	***	**			
t-2 to t+2	233	***	***	***	***	***	***	***	***	***	***	**	**
t-2 to t+3	147	***	***	***	***	***	***	***	***	***	***	***	**
t-1 to t+1	363	***	*	***	***	***	***	***	***	**		*	*
t-1 to t+2	233	***	***	***	***	**	***	***	***	**	*	*	**
t-1 to t+3	147	***	***	***	***	***	**	***	***	***	***	***	*

[a] "N" indicates total number of certified firms in the corresponding sample.
[b] The significance levels shown are those for the one-sided test of the null hypothesis of no abnormal performance, using the Wilcoxon signed rank test and sign test respectively.

Note: * p < .1; ** p < .05; *** p < .01.

Table A42: Significance of abnormal relative SALES growth under all 6 matching criteria

		industry, ROA, ASSETS				industry, ROA				industry, ASSETS			
		one-to-one		portfolio		one-to-one		portfolio		one-to-one		portfolio	
from year	N[a]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]
t-3 to *t*-2	405										*		
t-2 to *t*–1	554												
t-1 to *t*	554	**	*	**		***	***			**	*		
t to *t*+1	363	***	**	*		**				***	***		
t+1 to *t*+2	233												
t+2 to *t*+3	147	**	*	**		***	*			**	*		
t-2 to *t*	554					*	*						
t-2 to *t*+1	363	**				**				*			
t-2 to *t*+2	233					*				*			
t-2 to *t*+3	147					*	*			**			
t-1 to *t*+1	363	***	*	**		**	*			***	**		
t-1 to *t*+2	233	**		*		**	*			***	**		
t-1 to *t*+3	147	**	*	*		***	**			***	**		

[a] "N" indicates total number of certified firms in the corresponding sample.
[b] The significance levels shown are those for the one-sided test of the null hypothesis of no abnormal performance, using the Wilcoxon signed rank test and sign test respectively.

Note: * p < .1; ** p < .05; *** p < .01. "Abnormal relative sales growth" is defined by comparing $\frac{SALES_t - SALES_{t-1}}{SALES_{t-1}}$ of certified firms with that of the control firms.

Table A43: Significance of abnormal performance in SALES/ASSETS under all 6 matching criteria

		industry, ROA, ASSETS				industry, ROA				industry, ASSETS			
		one-to-one		portfolio		one-to-one		portfolio		one-to-one		portfolio	
from year	N[a]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]	WSR[b]	sign[b]
t-3 to *t*-2	405			*								*	**
t-2 to *t*–1	554							***	***				
t-1 to *t*	554	***	***	***	***	**	**	***	***				
t to *t*+1	363												
t+1 to *t*+2	233										*		
t+2 to *t*+3	147							*					
t-2 to *t*	554			*	**	**	***	***	***				
t-2 to *t*+1	363							***	***				
t-2 to *t*+2	233							***	***				
t-2 to *t*+3	147					*	*	***	**				
t-1 to *t*+1	363		**	*	*			**	***				
t-1 to *t*+2	233							**	***				
t-1 to *t*+3	147					**		***	***				

[a] "N" indicates total number of certified firms in the corresponding sample.
[b] The significance levels shown are those for the one-sided test of the null hypothesis of no abnormal performance, using the Wilcoxon signed rank test and sign test respectively.

Note: * p < .1; ** p < .05; *** p < .01.