

CHAPTER – 5

DATA DESCRIPTION

Our study includes all the firms whose information is available in the Center for Monitoring Indian Economy (CMIE) – Prowess database. The limit of our data was determined based on the data available in the CMIE database. Our study period criterion was to include as many firms as possible and to have adequate time period to capture the dynamics of capital structure. The sample includes all the firms, both listed and unlisted firms for a period of 25 years from 1989¹ to 2014.

Table2: Year wise distribution of the data on Number of firms and Market capitalization

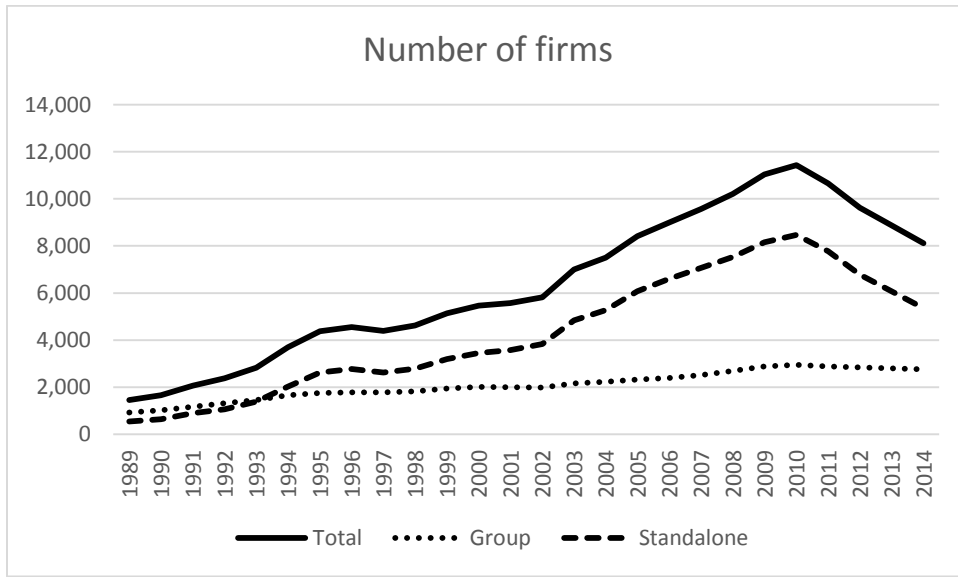
Year	Number of Firms			Market Capitalization*		
	Total	Group	Standalone	Total	Group	Standalone
1989	1,458	918 63%	540 37%	398,377	325,317 82%	73,060 18%
1990	1,657	1,013 61%	644 39%	585,669	484,522 83%	101,146 17%
1991	2,064	1,172	892 43%	2,237,522	1,791,351 80%	446,171 20%
1992	2,377	1,317 55%	1,060 45%	1,279,908	1,024,817 80%	255,091 0%
1993	2,833	1,453 51%	1,380 49%	2,624,436	2,065,532 79%	558,904 21%
1994	3,695	1,664 45%	2,031 55%	3,058,012	2,348,846 77%	709,166 23%
1995	4,379	1,756 40%	2,623 60%	2,778,597	2,195,141 79%	583,455 21%
1996	4,552	1,775 39%	2,777 61%	2,358,123	1,826,199 77%	531,924 23%

¹CMIE prowess database provides data from the year 1989. Hence, we choose this as the beginning of our study period.

1997	4,394	1,777 40%	2,617 60%		2,729,772	2,064,801 76%	664,971 24%
1998	4,616	1,828 40%	2,788 60%		3,581,645	2,616,124 73%	965,521 27%
1999	5,137	1,949 38%	3,188 62%		7,447,542	5,806,418 78%	1,641,124 22%
2000	5,462	2,015 37%	3,447 63%		3,920,918	2,977,244 76%	943,675 24%
2001	5,574	1,994 36%	3,580 64%		4,086,170	3,201,249 78%	884,921 22%
2002	5,822	1,991 34%	3,831 66%		3,502,140	2,615,524 75%	886,615 25%
2003	7,001	2,167 31%	4,834 69%		6,862,759	5,333,105 78%	1,529,654 22%
2004	7,506	2,229 30%	5,277 70%		10,293,502	7,775,949 76%	2,517,554 24%
2005	8,410	2,329 28%	6,081 72%		19,391,358	14,884,462 77%	4,506,895 23%
2006	8,992	2,391 27%	6,601 73%		23,712,996	18,786,786 79%	4,926,211 21%
2007	9,572	2,509 26%	7,063 74%		31,978,858	26,225,422 82%	5,753,436 18%
2008	10,210	2,685 26%	7,525 74%		17,826,358	14,017,213 79%	3,809,145 21%
2009	11,038	2,879 26%	8,159 74%		37,460,688	29,627,684 79%	7,833,005 21%
2010	11,426	2,953 26%	8,473 74%		41,564,156	32,564,408 78%	8,999,749 22%
2011	10,657	2,879 27%	7,778 73%		38,874,516	29,700,572 76%	9,173,945 24%
2012	9,623	2,841 30%	6,782 70%		40,233,752	30,562,840 76%	9,670,913 24%
2013	8,874	2,804 32%	6,070 68%		50,534,936	38,906,916 77%	11,628,023 23%
2014	8,118	2,759 34%	5,359 66%		68,618,032	51,700,900 75%	16,917,126 25%

**Market Capitalization is in Rs. Billions*

Graph 4: Distribution of Number of firms



Graph 5: Distribution of Market Capitalization

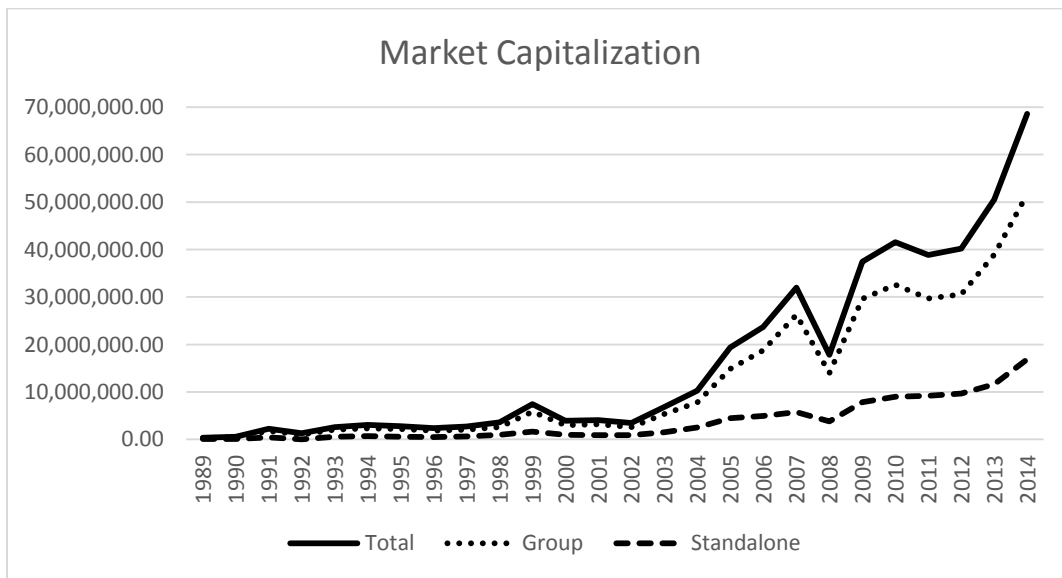


Table 1: Determinants of leverage used and their expected relationship with the leverage ratio

Sl.No.	Variable	Measurement	Source	Expected
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				Sign
1	Size	Natural Log of Sales	Rajan and Zingales (1995)	Positive
2	Tangibility	Fixed Assets/ Total Assets	Rajan and Zingales (1995)	Positive
3	Profitability	EBIT/Total Assets	Rajan and Zingales (1995)	Negative
4	Non Debt Tax Shield	(Depreciation + Amortization)/Total Assets	Graham (2000)	Negative
5	Growth Opportunities	Market to Book ratio	Rajan and Zingales (1995)	Negative
6	Industry Median Leverage	Median of leverage of all firms in the industry	Fama and French (1997)	Positive
7	Intangibility	Research and Development expenditure to Total Asset ratio	Graham (2000)	Negative
8	Rand D Dummy	One if Research and Development exp is present or zero otherwise	Flannery and Rangan (2006)	Positive

The variables are computed as stated in Table 2 and the descriptive statistics of the computed variables are as follows.

Table 3: Descriptive Statistics of the variables

	Observations	Mean	Std	Min	Max
MLEV	51,345	0.420	0.280657	0	0.9
BLEV_TA	151,401	0.332	0.222415	0	0.95

Sales	165,447	2315.576	22612.37	10	4013020
Size	165,447	5.827	1.809072	2.302	15.205
ROA	163,982	0.081	0.115187	-0.5	1
TANG	163,902	0.321	0.218817	0	0.9
NDTS	165,364	0.033	0.031363	0	0.4975
MB	51,848	2.279	4.08544	0.1	49.968
GR	139,711	0.155	0.288568	-0.5	1.5
RD Ratio	24,991	0.007	0.017758	0	0.4992
RD_DUM	165,447	0.149	0.355924	0	1
MED_MLEV	158,642	0.409	0.216814	0	0.9
MED_BLEV	165,262	0.316	0.120082	0	0.9497

The study has consider non financial non government owned firms from 1989 to 2014. We have also remove highly levered firms from the sample.

Table 4: Correlation coefficients

	MLEV	BLEV	Size	TANG	ROA	NDTS	MB	GR	RD_RATIO	RD_DUM	MLEV_IMED	BLEV_IMED
MLEV	1.000											
BLEV	0.6570*	1.000										
Size	0.0001	0.0480*	1.000									
TANG	0.2681*	0.2985*	-0.0692*	1.000								
ROA	-0.2860*	-0.1938*	0.2014*	-0.1434*	1.000							
NDTS	0.0873*	0.1212*	-0.0446*	0.4717*	-0.1095*	1.000						
MB	-0.3724*	-0.0116*	0.0683*	-0.0826*	0.2049*	0.0015	1.000					
GR	-0.1130*	-0.0078*	0.1126*	-0.1455*	0.2245*	-0.1922*	0.1190*	1.000				
RD_RATIO	-0.1826*	-0.1102*	-0.0613*	-0.0335*	0.0325*	0.0531*	0.1342*	0.0153*	1.000			
RD_DUM	-0.0523*	-0.0412*	0.3039*	0.0095*	0.0987*	-0.0009	0.0529*	-0.0059*	0.0491*	1.000		
MLEV_IMED	0.5846*	0.2533*	0.0524*	0.1979*	-0.1060*	0.0553*	-0.2986*	-0.0902*	-0.1603*	-0.0017	1.000	
BLEV_IMED	0.3566*	0.4216*	0.0901*	0.2949*	0.0785*	0.0955*	-0.0730*	-0.0444*	-0.1472*	0.0024	0.6016*	1.000

As we can observe there is no serious impact correlation between the variables used in the analysis.

We present the variables computed from our data in a yearwise format classified as combined, Group affiliated and standalone.

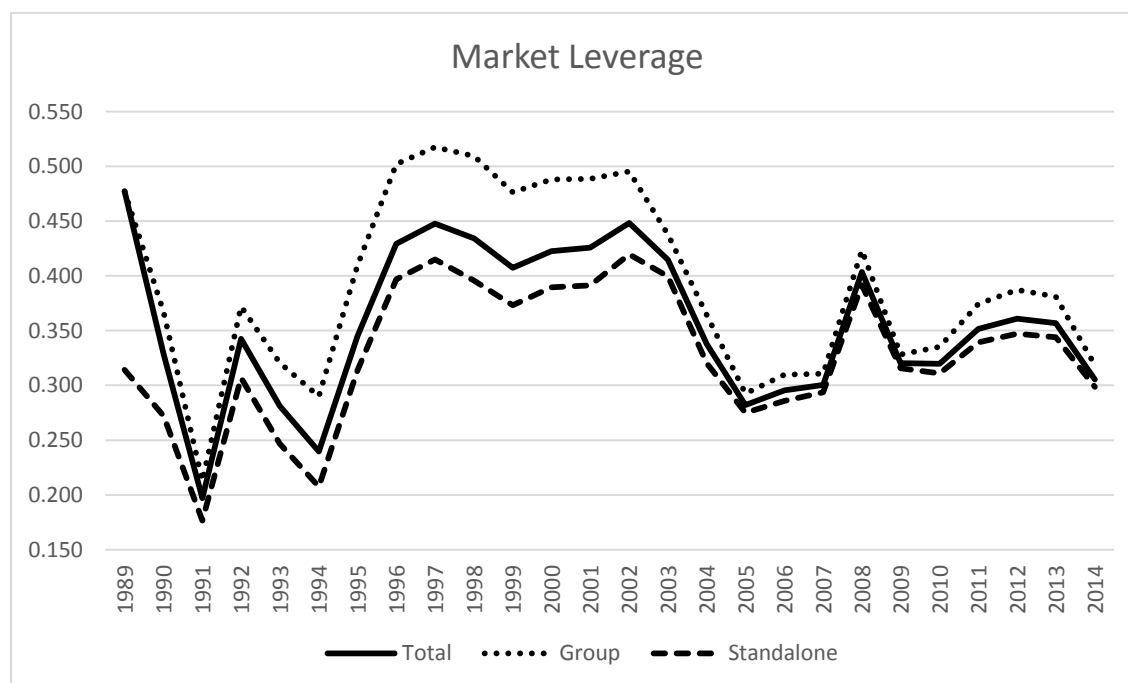
The Market leverage variable is defined as the ratio of total borrowings to market value of firm. In our data, the negative and bankrupt firms have been discarded. The following table provides yearwise average market leverage values of combined, group affiliated and standalone firms.

Table 5: Year wise distribution of Average Market leverage

Year	Market Leverage		
	Total	Group	Standalone
1989	0.477	0.477	0.314
1990	0.328	0.367	0.272
1991	0.197	0.213	0.176
1992	0.342	0.372	0.307
1993	0.281	0.321	0.247
1994	0.240	0.290	0.207
1995	0.345	0.410	0.314
1996	0.429	0.502	0.397
1997	0.448	0.518	0.415
1998	0.434	0.509	0.396
1999	0.407	0.476	0.373
2000	0.423	0.488	0.389
2001	0.426	0.489	0.391
2002	0.448	0.496	0.420
2003	0.415	0.438	0.400
2004	0.338	0.364	0.320
2005	0.282	0.293	0.275
2006	0.295	0.310	0.286
2007	0.300	0.311	0.294
2008	0.404	0.424	0.392
2009	0.320	0.328	0.316
2010	0.320	0.335	0.311
2011	0.352	0.374	0.339
2012	0.361	0.387	0.347
2013	0.357	0.381	0.344
2014	0.305	0.319	0.299

Observations	Mean	Std	Min	Max	Skewness	Kurtosis	JB Stat	P-VALUE
67,786	0.352	0.297746	0	0.9	0.2907	-1.3192	5,154.136	0.000

Graph 6: Year wise distribution of market leverage



As clearly observed from the table above, market leverage of the firms, both group and standalone, in the sample are systematically reducing their leverage. Also, since the JB stat is high there is no evidence to show that the variable follows normal distribution.

The Book leverage variable is defined as the ratio of total borrowings to book value of firm. In our data, the negative and bankrupt firms have been discarded. The following table provides yearwise average book leverage values of combined, group affiliated and standalone firms.

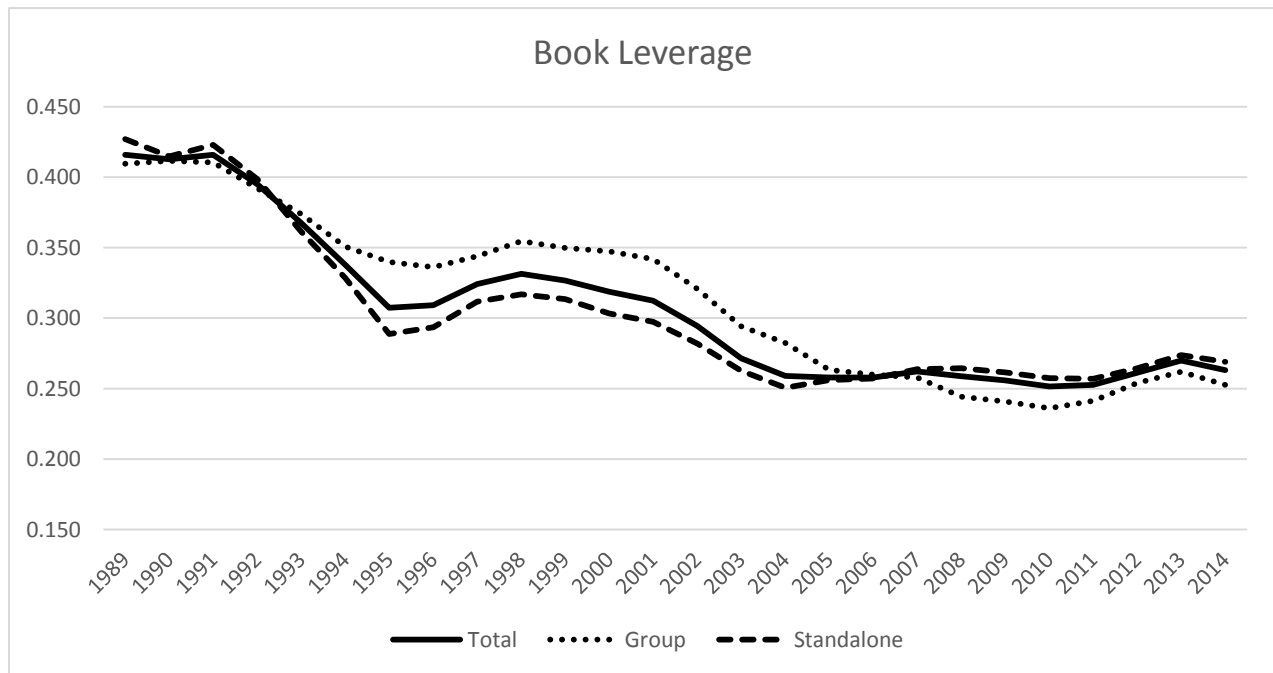
Table 6: Year wise distribution of Average Book leverage

Year	Book Leverage		
	Combined	Group	Standalone
1989	0.416	0.410	0.427
1990	0.413	0.412	0.415
1991	0.416	0.411	0.423
1992	0.395	0.392	0.399
1993	0.368	0.374	0.361
1994	0.338	0.351	0.329
1995	0.307	0.340	0.289
1996	0.309	0.336	0.294
1997	0.324	0.344	0.312
1998	0.331	0.355	0.317
1999	0.327	0.350	0.313
2000	0.319	0.347	0.303
2001	0.312	0.342	0.297
2002	0.294	0.321	0.282
2003	0.271	0.294	0.263
2004	0.259	0.282	0.251
2005	0.258	0.263	0.256
2006	0.258	0.260	0.257
2007	0.262	0.258	0.264
2008	0.259	0.244	0.264
2009	0.256	0.241	0.261

2010	0.252	0.236	0.257
2011	0.253	0.241	0.257
2012	0.261	0.254	0.265
2013	0.270	0.262	0.274
2014	0.263	0.253	0.269

Observations	Mean	Std	Min	Max	Skewness	Kurtosis	JB Stat	P-VALUE
226,087	0.278	0.248393	0	0.95	0.5615	-0.6585	7,055.087	0.000

Graph 7: Year wise distribution of book leverage



Observing the table above, Firms in the sample have been reducing their book leverage over the years. Further, the Jacque Bera statistic of the variable is very high indicating that there is no sufficient evidence to say that the variable follows normal distribution.

The data for sales is not used in the study either to prove or disprove the hypotheses. The study provides the information of statistics for necessary understanding of the impact of sales on leverage.

Table 7: Yearwise distribution of Average Sales

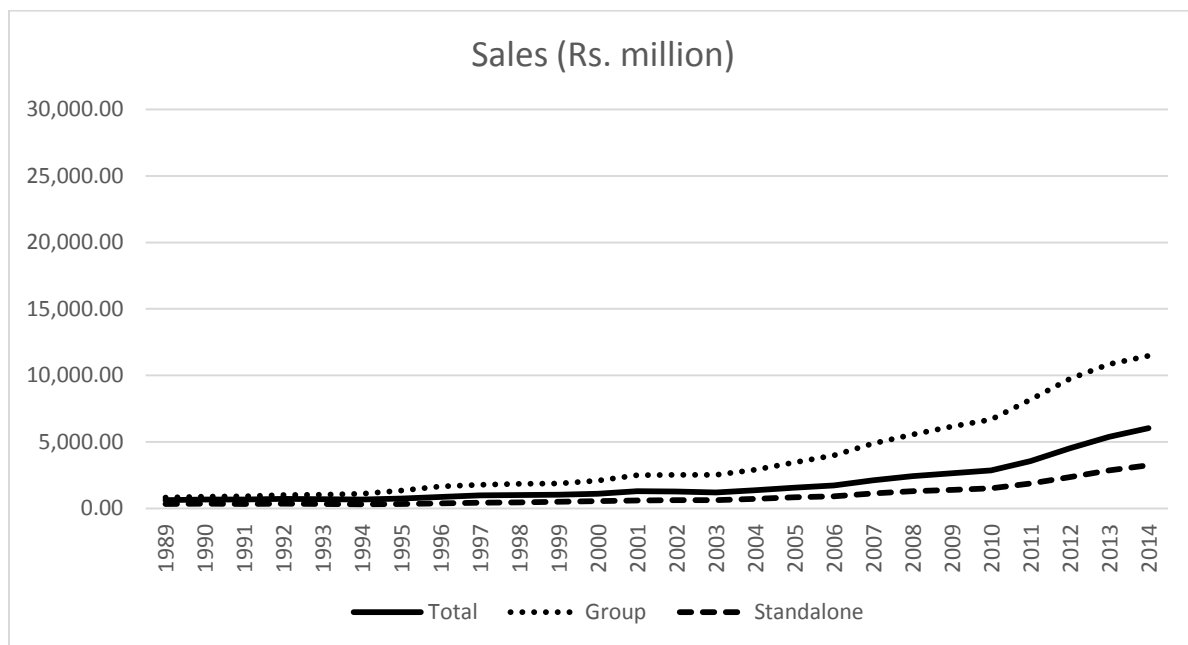
Year	Sales*		
	Total	Group	Standalone
1989	625.94	805.18	321.24
1990	673.96	873.20	360.56
1991	658.40	902.12	338.18
1992	706.28	990.58	353.05
1993	692.93	1,031.93	336.00
1994	667.43	1,107.16	307.15
1995	727.21	1,333.54	321.30
1996	867.33	1,641.33	372.60
1997	969.57	1,779.86	419.37
1998	1,010.71	1,851.78	459.24
1999	1,014.01	1,878.06	485.76
2000	1,109.28	2,077.71	543.17
2001	1,279.94	2,504.19	598.05
2002	1,259.12	2,512.34	607.81
2003	1,202.21	2,526.78	608.43
2004	1,357.46	2,906.82	703.01
2005	1,557.50	3,463.30	827.59
2006	1,719.65	3,993.23	896.11

2007	2,104.82	4,865.94	1,123.98
2008	2,414.87	5,540.54	1,299.59
2009	2,629.59	6,145.05	1,389.12
2010	2,845.66	6,682.17	1,508.57
2011	3,560.62	8,162.71	1,857.17
2012	4,525.20	9,734.43	2,343.03
2013	5,383.53	10,842.03	2,862.02
2014	6,041.18	11,463.86	3,249.40

*In Rs. million

Observations	Mean	Std	Min	Max	Skewness	Kurtosis	JB Stat	P-VALUE
170,837	2536.314	24734.02	10	0.9	93.0804	12421.6180	1.09838E+12	0.000

Graph 8: Year wise distribution of Sales



As observed from the table and the graph the variable sales has very high differences in scales over the years. The study uses the logarithmic form of it as a measure of the size of the firms. The variable has very high JB stat and the study does not have enough evidence to prove that the variable is normally distributed.

The variable size is computed as the logarithm of sales.

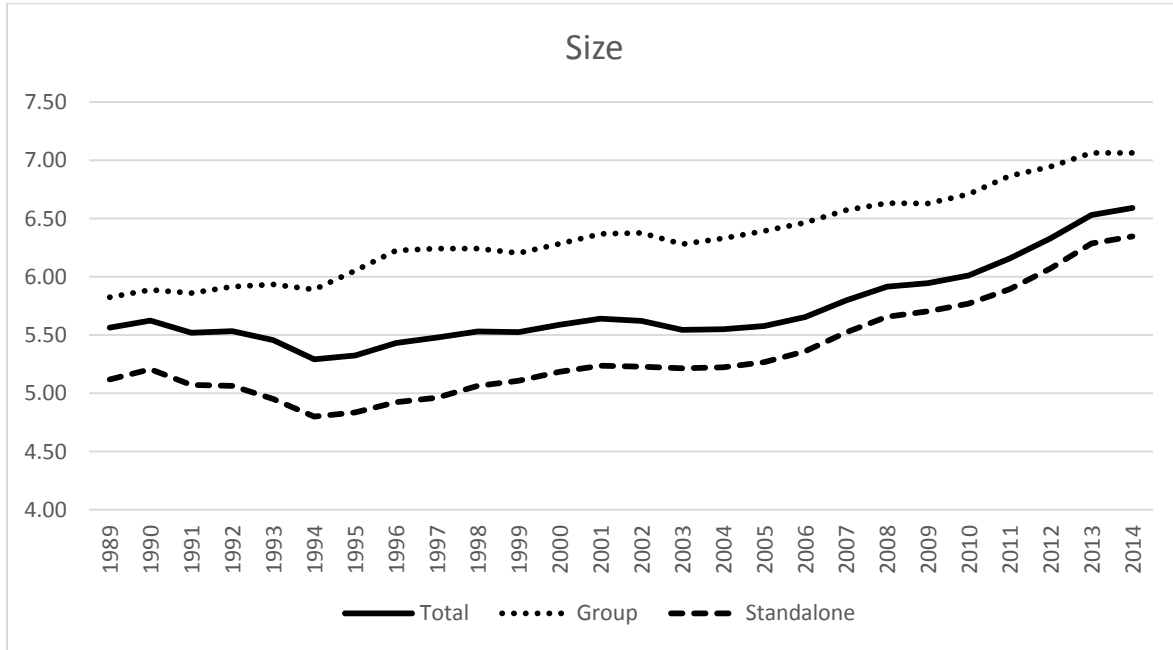
Table 8: Yearwise distribution of Average Size

Year	Size		
	Total	Group	Standalone
1989	5.56	5.83	5.12
1990	5.62	5.89	5.21
1991	5.52	5.86	5.07
1992	5.53	5.91	5.06
1993	5.46	5.94	4.95
1994	5.29	5.89	4.80
1995	5.32	6.05	4.84
1996	5.43	6.22	4.92
1997	5.48	6.24	4.96
1998	5.53	6.24	5.06
1999	5.52	6.20	5.11
2000	5.59	6.28	5.18
2001	5.64	6.37	5.24
2002	5.62	6.38	5.23

2003	5.55	6.28	5.21
2004	5.55	6.33	5.22
2005	5.58	6.39	5.27
2006	5.65	6.46	5.36
2007	5.80	6.57	5.52
2008	5.91	6.63	5.66
2009	5.95	6.63	5.70
2010	6.01	6.71	5.77
2011	6.16	6.86	5.89
2012	6.33	6.94	6.07
2013	6.53	7.06	6.29
2014	6.59	7.06	6.35

Observations	Mean	Std	Min	Max	Skewness	Kurtosis	JB Stat	P-VALUE
170,837	5.859	1.8303	2.302	15.205	0.3215	-0.1150	829.857	0.000

Graph 9: Year wise distribution of Size



As observed, the avg. size of all types of firms is increasing and there is clear difference between avg. size of the group affiliated firms and that of the standalone firms. The value of the JB Stat is very high and we cannot statistically state that there is evidence that the variable size is normally distributed.

The variable Tangibility is computed as the ratio of Fixed assets to Total assets.

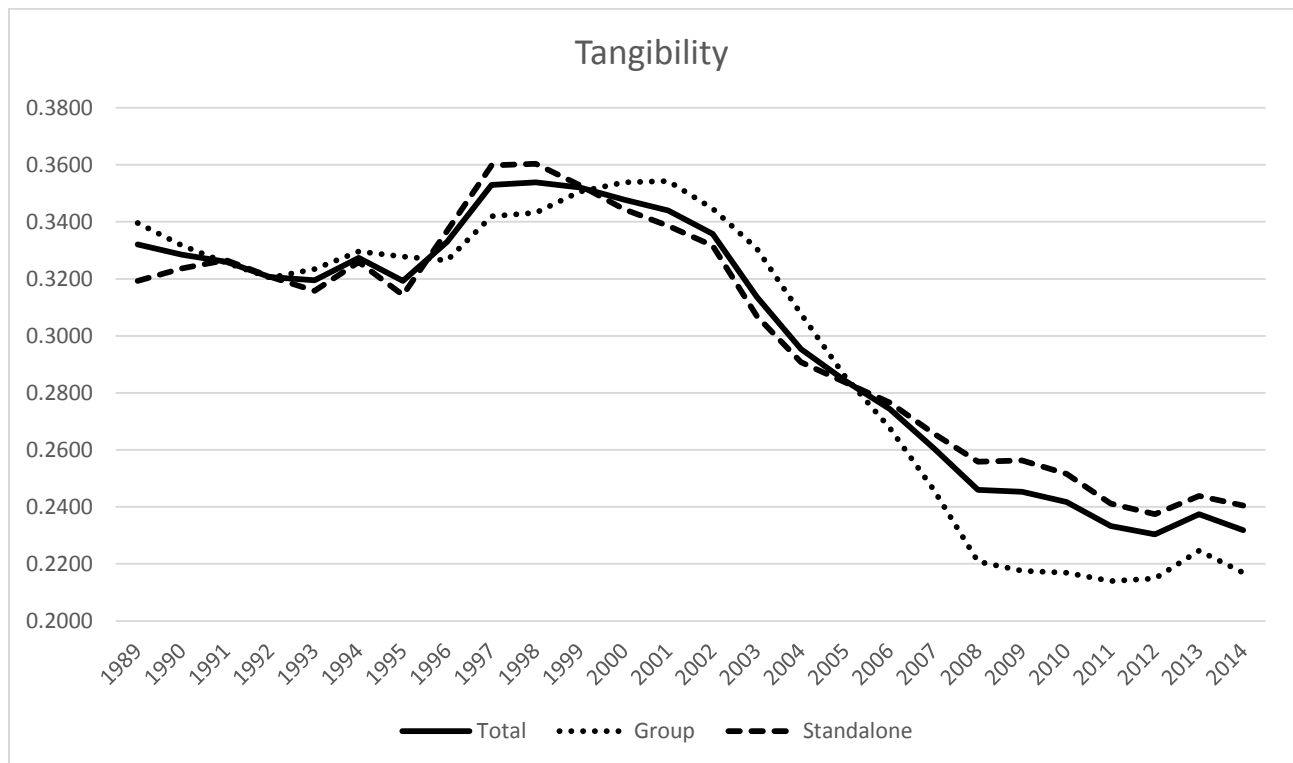
Table 9: Yearwise distribution of Average Tangibility

Year	Tangibility		
	Total	Group	Standalone
1989	0.3321	0.3396	0.3193
1990	0.3285	0.3317	0.3237
1991	0.3261	0.3257	0.3265
1992	0.3206	0.3204	0.3208
1993	0.3195	0.3234	0.3158
1994	0.3274	0.3296	0.3259
1995	0.3193	0.3278	0.3143
1996	0.3330	0.3265	0.3368
1997	0.3529	0.3419	0.3599
1998	0.3538	0.3432	0.3603
1999	0.3521	0.3506	0.3529
2000	0.3478	0.3539	0.3445
2001	0.3440	0.3543	0.3386
2002	0.3358	0.3447	0.3316
2003	0.3137	0.3306	0.3069
2004	0.2953	0.3077	0.2908
2005	0.2842	0.2858	0.2837
2006	0.2744	0.2678	0.2767
2007	0.2605	0.2460	0.2658
2008	0.2460	0.2209	0.2558
2009	0.2453	0.2176	0.2563
2010	0.2417	0.2170	0.2515
2011	0.2333	0.2140	0.2411
2012	0.2304	0.2149	0.2375
2013	0.2374	0.2246	0.2439

2014	0.2318	0.2169	0.2405
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Observations	Mean	Std	Min	Max	Skewness	Kurtosis	JB Stat	P-VALUE
240,185	0.276	0.24173	0	0.9	0.6359	-0.5936	7,573.102	0.000

Graph 10: Year wise distribution of tangibility



As observed, there is decrease in the avg. Tangibility of the firms over the years. With the group affiliated firms having a higher degree of decrease than standalone firms. The JB Stat of the

variable is high and we cannot find statistically significant evidence to prove that the variable is normally distributed.

The Variable of return on Assets is computed as the ratio of Earnings Before Interest and Tax to Total assets.

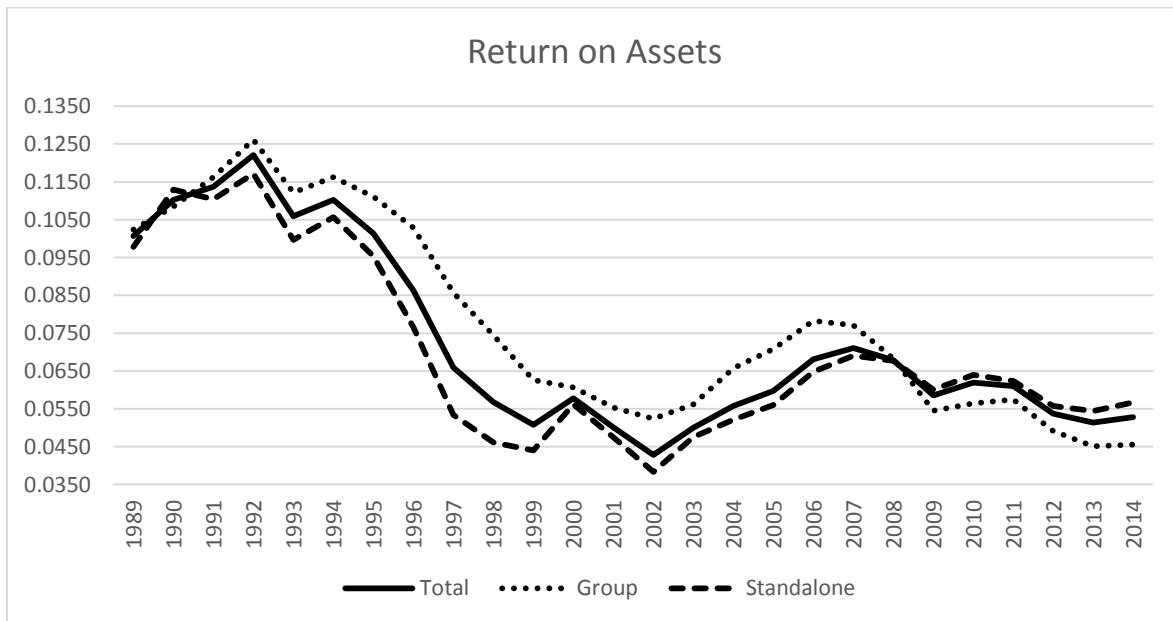
Table10: Yearwise distribution of Average Return on Assets

Year	Return on Assets		
	Total	Group	Standalone
1989	0.1007	0.1024	0.0978
1990	0.1102	0.1085	0.1129
1991	0.1137	0.1162	0.1104
1992	0.1221	0.1262	0.1172
1993	0.1059	0.1122	0.0996
1994	0.1102	0.1162	0.1056
1995	0.1013	0.1110	0.0953
1996	0.0863	0.1029	0.0765
1997	0.0659	0.0857	0.0534
1998	0.0568	0.0744	0.0461
1999	0.0507	0.0626	0.0440
2000	0.0578	0.0607	0.0561
2001	0.0501	0.0553	0.0474
2002	0.0428	0.0523	0.0384
2003	0.0500	0.0562	0.0475
2004	0.0558	0.0657	0.0521
2005	0.0598	0.0709	0.0560
2006	0.0681	0.0782	0.0648
2007	0.0711	0.0771	0.0691

2008	0.0678	0.0682	0.0677
2009	0.0586	0.0545	0.0601
2010	0.0619	0.0564	0.0640
2011	0.0610	0.0575	0.0624
2012	0.0538	0.0491	0.0557
2013	0.0514	0.0451	0.0544
2014	0.0528	0.0455	0.0567

Observations	Mean	Std	Min	Max	Skewness	Kurtosis	JB Stat	P-VALUE
220,942	0.064	0.1255	-0.5	1	0.6902	7.5819	533,592.875	0.000

Graph 11: Year wise distribution of ROA



As observed, disregarding the variable in years 2015 and 2016, Average ROA of group firms have been higher than that of standalone firms till the year 2008. Post which the standalone firms

have a high ROA than that of group firms. This an interesting finding and needs further examination. ROA variable has very high JB statistic and it found that there is no statistical evidence to show that its normally distributed.

Non Debt Tax Shield variable is computed as the ratio of Deperciation and amortization to Total assets.

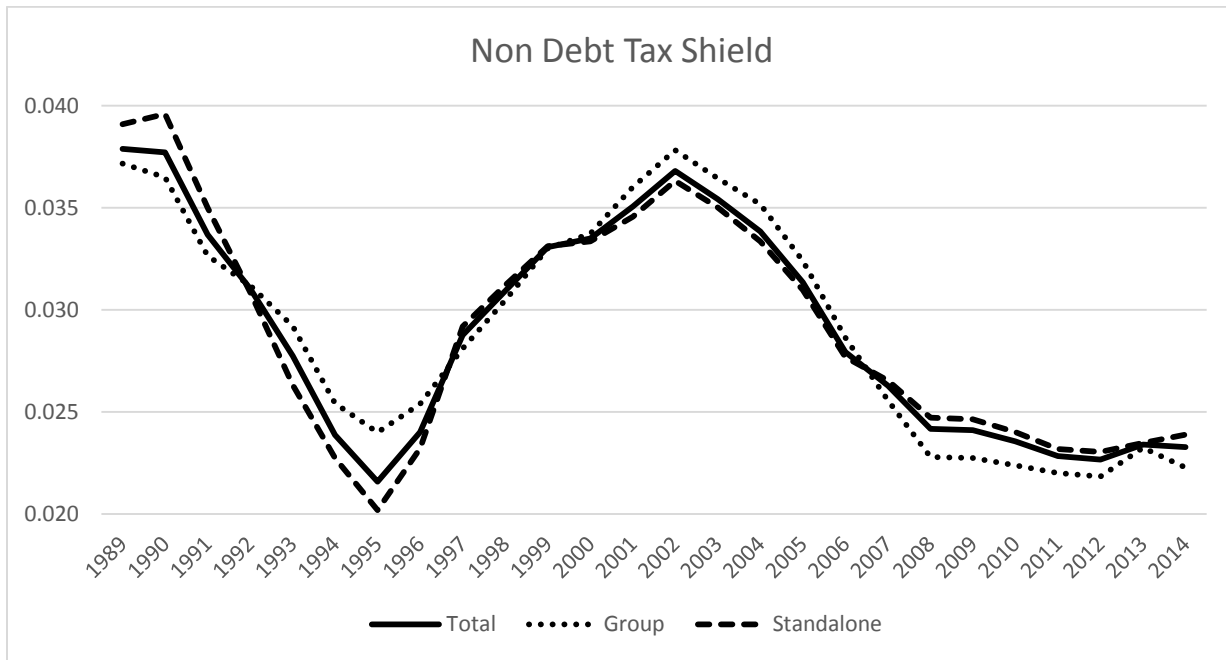
Table 11: Yearwise distribution of Average Non Debt Tax Shield

Year	Non Debt Tax Shield		
	Total	Group	Standalone
1989	0.038	0.037	0.039
1990	0.038	0.036	0.040
1991	0.034	0.033	0.035
1992	0.031	0.031	0.031
1993	0.028	0.029	0.026
1994	0.024	0.025	0.023
1995	0.022	0.024	0.020
1996	0.024	0.025	0.023
1997	0.029	0.028	0.029
1998	0.031	0.030	0.031
1999	0.033	0.033	0.033
2000	0.033	0.034	0.033
2001	0.035	0.036	0.035
2002	0.037	0.038	0.036

2003	0.035	0.036	0.035
2004	0.034	0.035	0.033
2005	0.031	0.032	0.031
2006	0.028	0.029	0.028
2007	0.026	0.026	0.027
2008	0.024	0.023	0.025
2009	0.024	0.023	0.025
2010	0.024	0.022	0.024
2011	0.023	0.022	0.023
2012	0.023	0.022	0.023
2013	0.023	0.023	0.023
2014	0.023	0.022	0.024

Observations	Mean	Std	Min	Max	Skewness	Kurtosis	JB Stat	P-VALUE
246,269	0.027	0.0355	0	0.5	3.9606	29.4011	9,030,975.825	0.000

Graph 11: Year wise distribution of NDTS



As observed, Group firms till 2007 used a higher percentage of NDTS to Total assets than the standalone firms, whereas the data reveals a contrasting feature post 2007. NDTS variable has very high value of JB Stat thus there is no evidence to show that its normally distributed.

The market to book ratio variable is computed as the ratio of market capitalization to the book value of the equity of the firm.

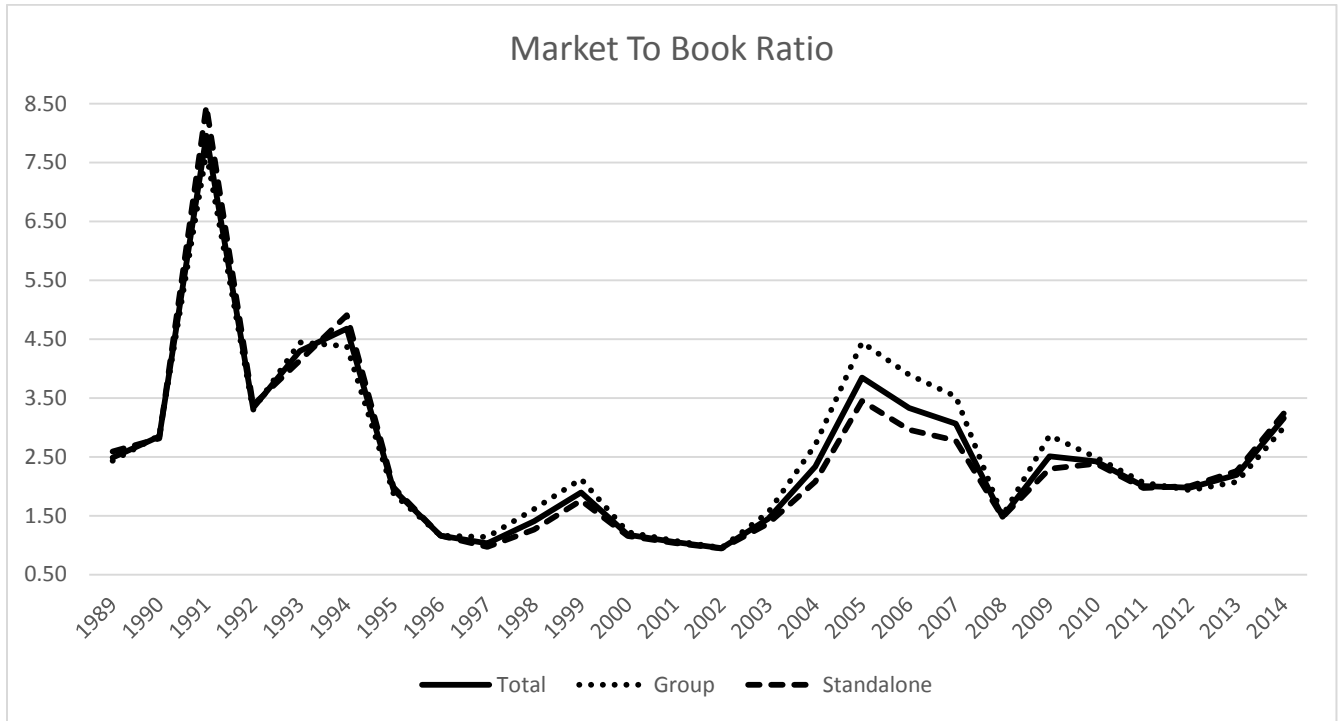
Table 12: Yearwise distribution of Average Market to Book ratio

Year	Market to Book ratio		
	Total	Group	Standalone
1989	2.49	2.44	2.59
1990	2.85	2.86	2.81
1991	7.96	7.66	8.46
1992	3.33	3.30	3.38

1993	4.30	4.44	4.13
1994	4.68	4.38	4.91
1995	1.94	1.87	1.98
1996	1.16	1.16	1.16
1997	1.03	1.14	0.97
1998	1.41	1.62	1.27
1999	1.90	2.13	1.76
2000	1.18	1.22	1.16
2001	1.05	1.07	1.04
2002	0.95	0.96	0.94
2003	1.45	1.56	1.37
2004	2.33	2.70	2.08
2005	3.85	4.45	3.45
2006	3.33	3.90	2.96
2007	3.07	3.53	2.78
2008	1.48	1.50	1.48
2009	2.51	2.86	2.30
2010	2.42	2.49	2.38
2011	2.01	2.07	1.97
2012	1.98	1.93	2.00
2013	2.19	2.07	2.26
2014	3.16	3.00	3.24

Observations	Mean	Std	Min	Max	Skewness	Kurtosis	JB Stat	P-VALUE
60,159	2.369	4.352	0.1	49.96	5.0185	33.9551	2,953,133.990	0.000

Graph 12 Year wise distribution of Market to book ratio



Interestingly the MB ratio is very similar to both group and standalone firms over the years. And has been between 1 to 3 times post 1991. The JB stat value for the variable is very high and then we don't have sufficient significant statistical proof to show that the variable has a normal distribution.

The growth rate variable is computed as the rate of increase of total assets. i.e. $(TA_{t+1} - TA_t) / TA_t$.

This is used as a proxy for growth instead of Market to Book ratio for unlisted companies.

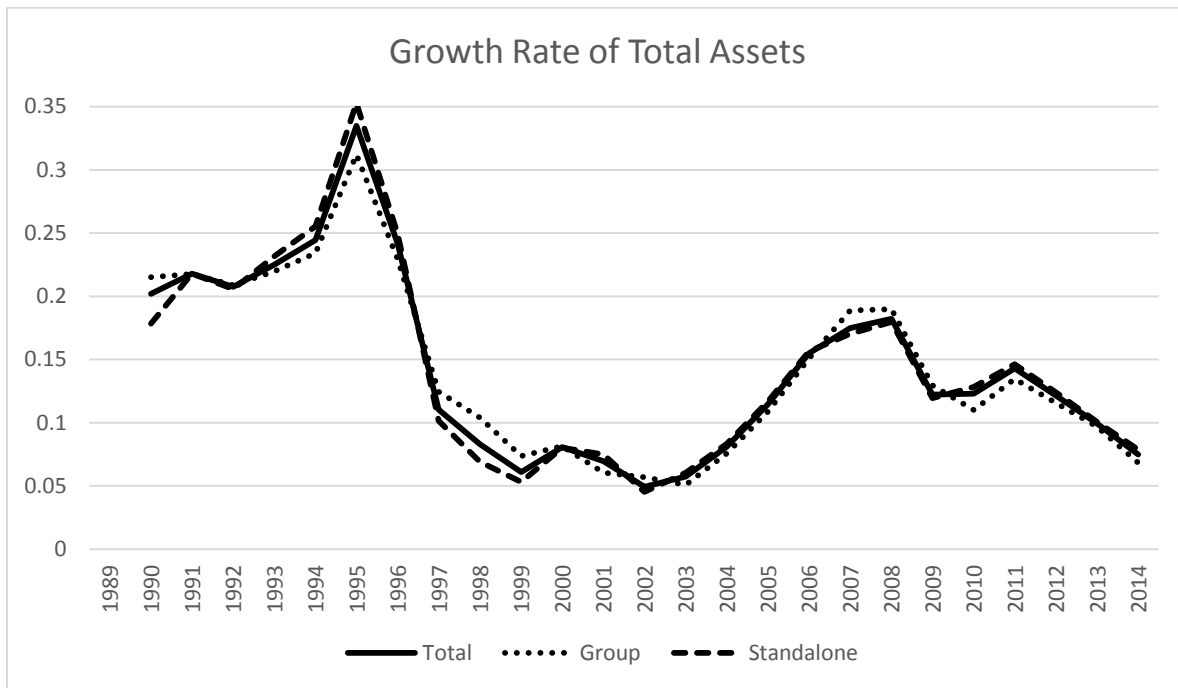
Table 13: Yearwise distribution of Average Growth rate of Total Assets

Year	Growth rate of Total Assets		
	Total	Group	Standalone
1990	0.202	0.215	0.178
1991	0.218	0.218	0.218
1992	0.207	0.209	0.206
1993	0.225	0.220	0.232
1994	0.245	0.234	0.255
1995	0.335	0.312	0.353
1996	0.241	0.229	0.249
1997	0.110	0.124	0.101
1998	0.083	0.104	0.069
1999	0.061	0.074	0.053
2000	0.081	0.081	0.080
2001	0.070	0.060	0.075
2002	0.049	0.057	0.045
2003	0.057	0.051	0.061
2004	0.081	0.076	0.083
2005	0.115	0.109	0.117
2006	0.155	0.151	0.156
2007	0.175	0.189	0.170
2008	0.182	0.190	0.180
2009	0.122	0.130	0.119
2010	0.123	0.110	0.128
2011	0.143	0.135	0.146
2012	0.121	0.116	0.124
2013	0.099	0.097	0.101

2014	0.075	0.068	0.079

Observations	Mean	Std	Min	Max	Skewness	Kurtosis	JB Stat	P-VALUE
197,205	0.126	0.288	-0.5	1.5	1.7139	4.2121	169,915.803	0.000

Graph 13: Year wise distribution of Growth Rate



The variable has very high JB statistic and there is no statistical evidence to show normal distribution of the variable.

The research and development variable is computed as the ratio of total expenditure on research and development to total assets.

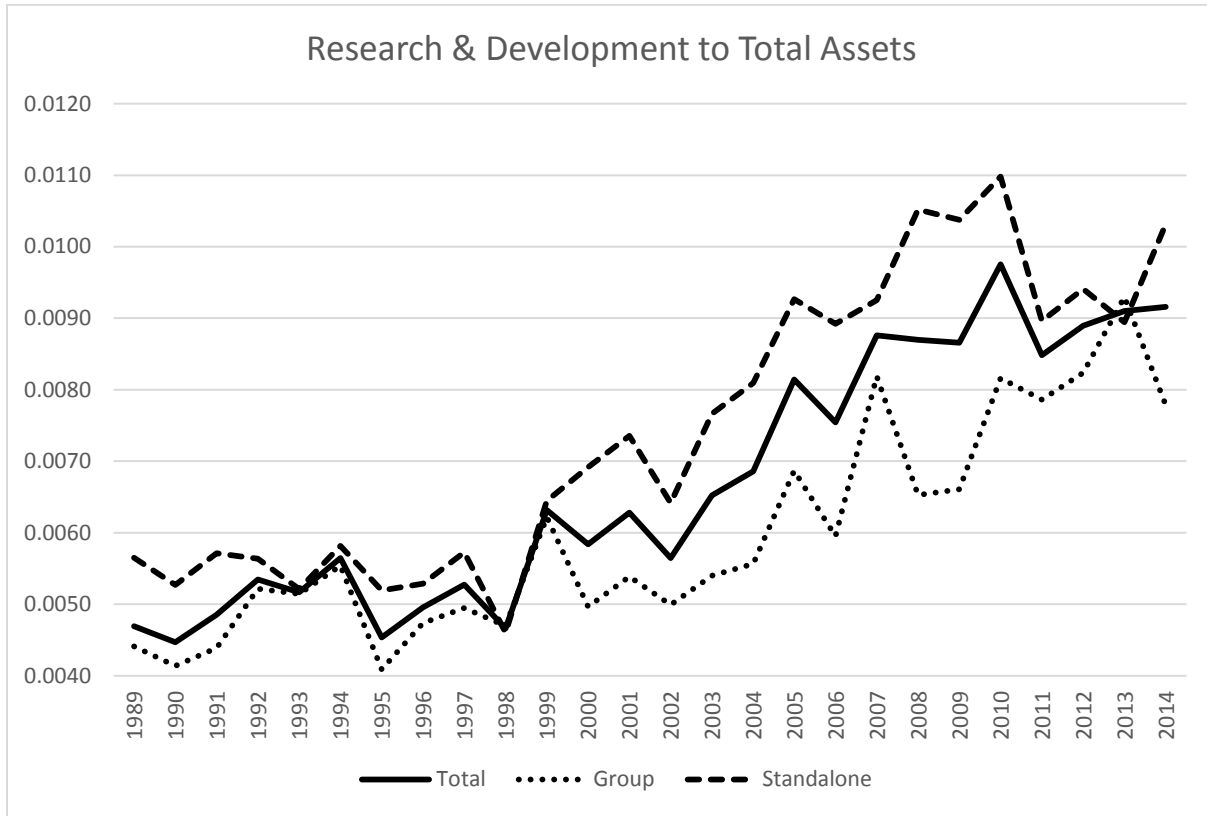
Table 14: Yearwise distribution of Average Research and Development to Total assets ratio

Year	Research and Development to total assets		
	Total	Group	Standalone
1989	0.0047	0.0044	0.0056
1990	0.0045	0.0041	0.0053
1991	0.0049	0.0044	0.0057
1992	0.0053	0.0052	0.0056
1993	0.0052	0.0051	0.0052
1994	0.0056	0.0055	0.0058
1995	0.0045	0.0041	0.0052
1996	0.0050	0.0047	0.0053
1997	0.0053	0.0049	0.0057
1998	0.0047	0.0047	0.0046
1999	0.0063	0.0062	0.0064
2000	0.0058	0.0050	0.0069
2001	0.0063	0.0054	0.0074
2002	0.0056	0.0050	0.0064
2003	0.0065	0.0054	0.0077
2004	0.0069	0.0056	0.0081
2005	0.0081	0.0069	0.0093

2006	0.0075	0.0060	0.0089
2007	0.0088	0.0082	0.0093
2008	0.0087	0.0065	0.0105
2009	0.0087	0.0066	0.0104
2010	0.0098	0.0082	0.0110
2011	0.0085	0.0079	0.0090
2012	0.0089	0.0082	0.0094
2013	0.0091	0.0093	0.0089
2014	0.0092	0.0078	0.0103

Observations	Mean	Std	Min	Max	Skewness	Kurtosis	JB Stat	P-VALUE
26,131	0.007	0.01927	0	0.5	11.8867	211.9634	49,071,618.151	0.000

Graph 14: Year wise distribution of R&D to Total Assets



As observed from the table and graph, there has been a gradual increase in the Research and Development expenditure of firms from all backgrounds. And interestingly, group firms have a lesser RD expenditure to total assets ratio than standalone firms, this needs further examination. The RD variable has very high JB statistic value, consequently there is no sufficient statistical evidence to show that the variable is normally distributed.

The GDP growth rate is accessed from the World Bank database for the study period , .i.e. 1989 to 2016. The variable will be used in equation (4) to examine the effect of macroeconomic condition on SOA.

Table 15: Yearwise distribution of GDP growth rate

Year	GDP rate (%)
1989	5.95
1990	5.53
1991	1.06
1992	5.48
1993	4.75
1994	6.66
1995	7.57
1996	7.55
1997	4.05
1998	6.18
1999	8.85
2000	3.84
2001	4.82
2002	3.80
2003	7.86

2004	7.92
2005	9.28
2006	9.26
2007	8.61
2008	3.89
2009	8.48
2010	10.26
2011	6.64
2012	5.62
2013	6.64
2014	7.24

Graph 15: Year wise distribution of R&D to Total Assets

