

Stock Market Analysis

Technical Specification

Assumptions

1. Default format for "Date" Column is used with data type "Date"
2. In Question 4, the input date is expected in "Date" format

Question 1

1. Created a column as "format_date" with data type "Date" for all 6 stocks; to do operations like ascending, descending etc.
2. Using column "format_date" Created bajaj1, eicher1, hero1, infosys1, tcs1 and tvs1.
3. For all above tables data type used for "date" column as "Date" because using "date" as data type "Text" yields incorrect results
4. Remove top 50 rows for all above tables as Moving Averages for these rows is not applicable or incalculable.

Question 2

1. Created master table using inner join query on "bajaj auto", "tcs", "tvs motors", "infosys", "eicher motors" and "hero motocorp".

Question 3

1. Created column "signal" using column "20 Day MA" and "50 Day MA". Logic for Signal:
 - a. If there is a trend change as compared to previous day then there is change of "Sell" or "Buy" signal
 - b. If "20 Day MA" is greater than "50 Day MA" in trend change then signal is "Buy".
 - c. If "20 Day MA" is smaller than "50 Day MA" in trend change then signal is "Sell".

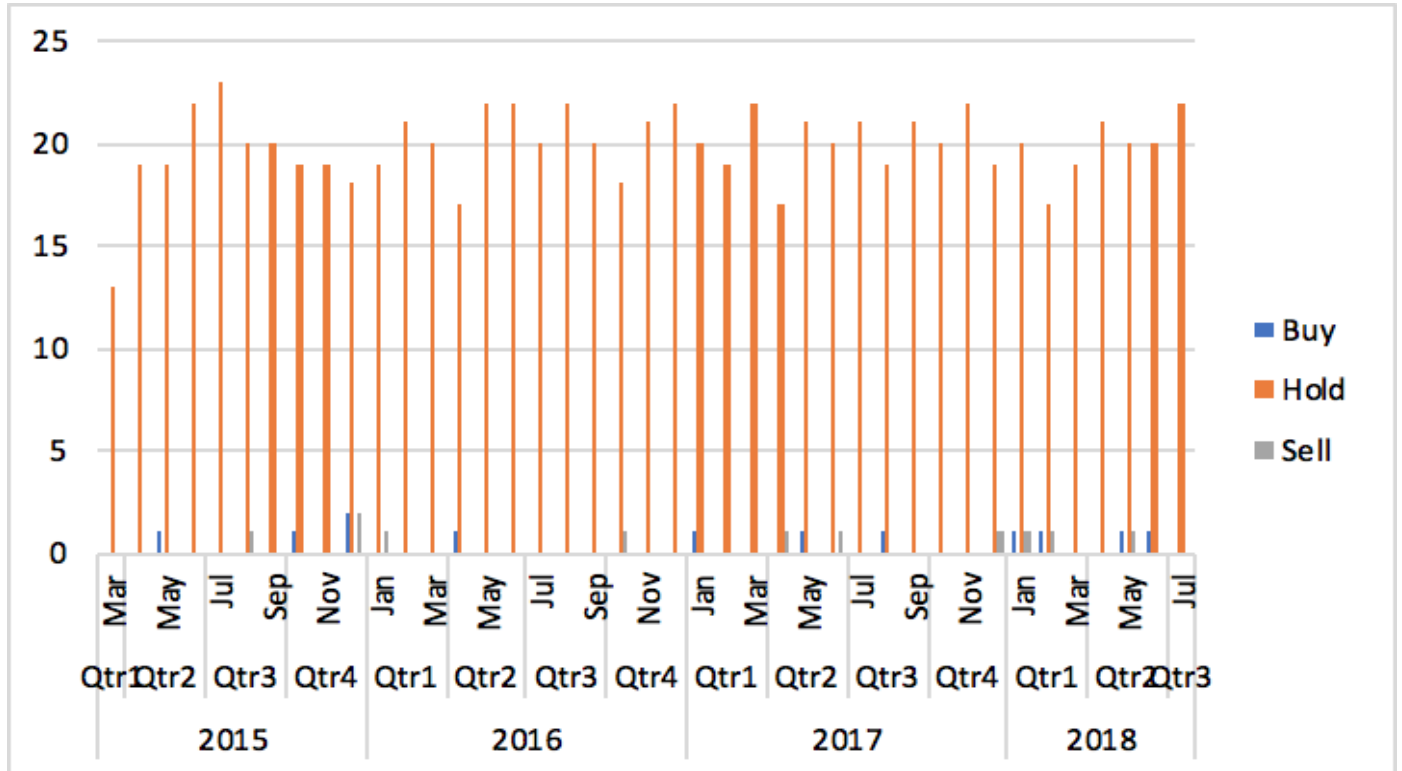
Question 4

1. Created a user defined function which takes "date" as input and gives signal as output as Buy/Sell/Hold.
2. For this function, as mentioned in assumption, input is expected in "Date" format as mentioned in question as well.

Summary

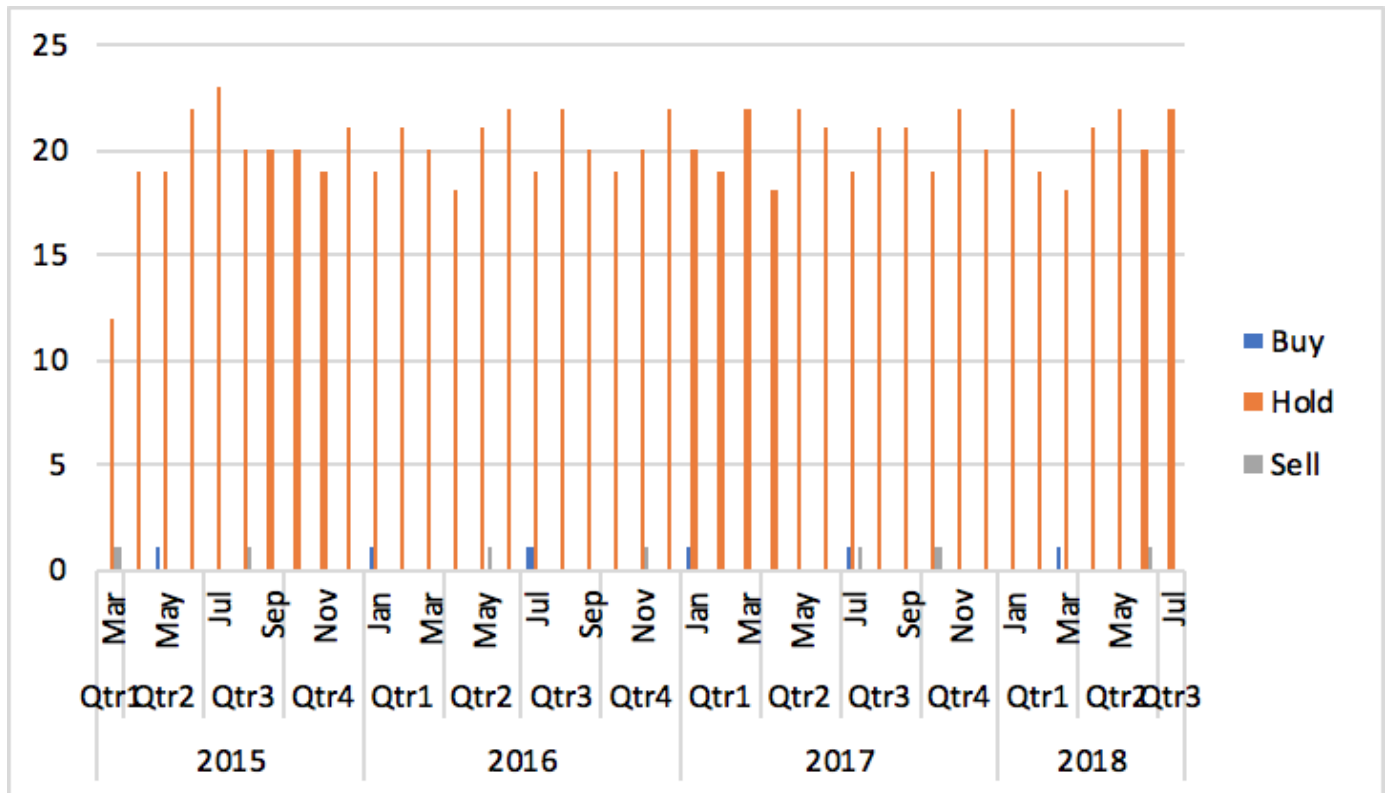
Bajaj Auto

Below is the table and chart for variation of signal based on dates. Data used for this is available in Annexure 1



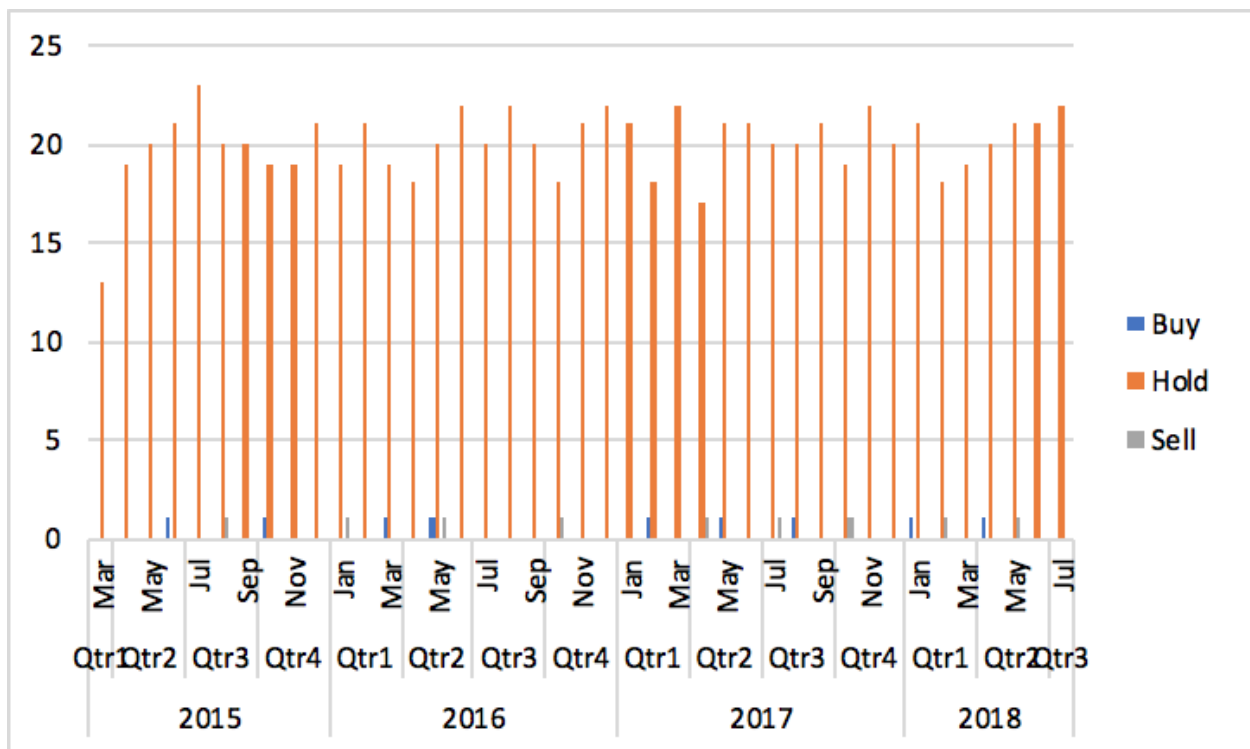
Eicher Motors

Below is the table and chart for variation of signal based on dates. Data used for this is available in Annexure 2



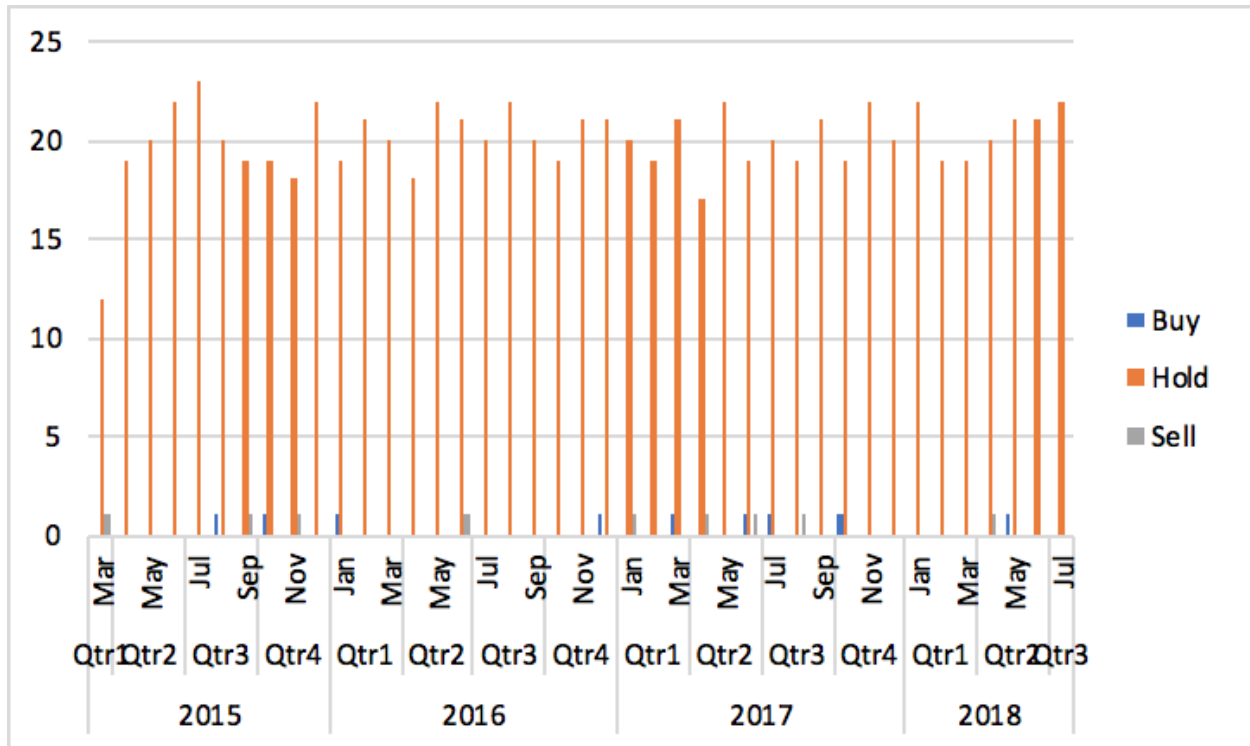
Hero Motocorp

Below is the table and chart for variation of signal based on dates. Data used for this is available in Annexure 3



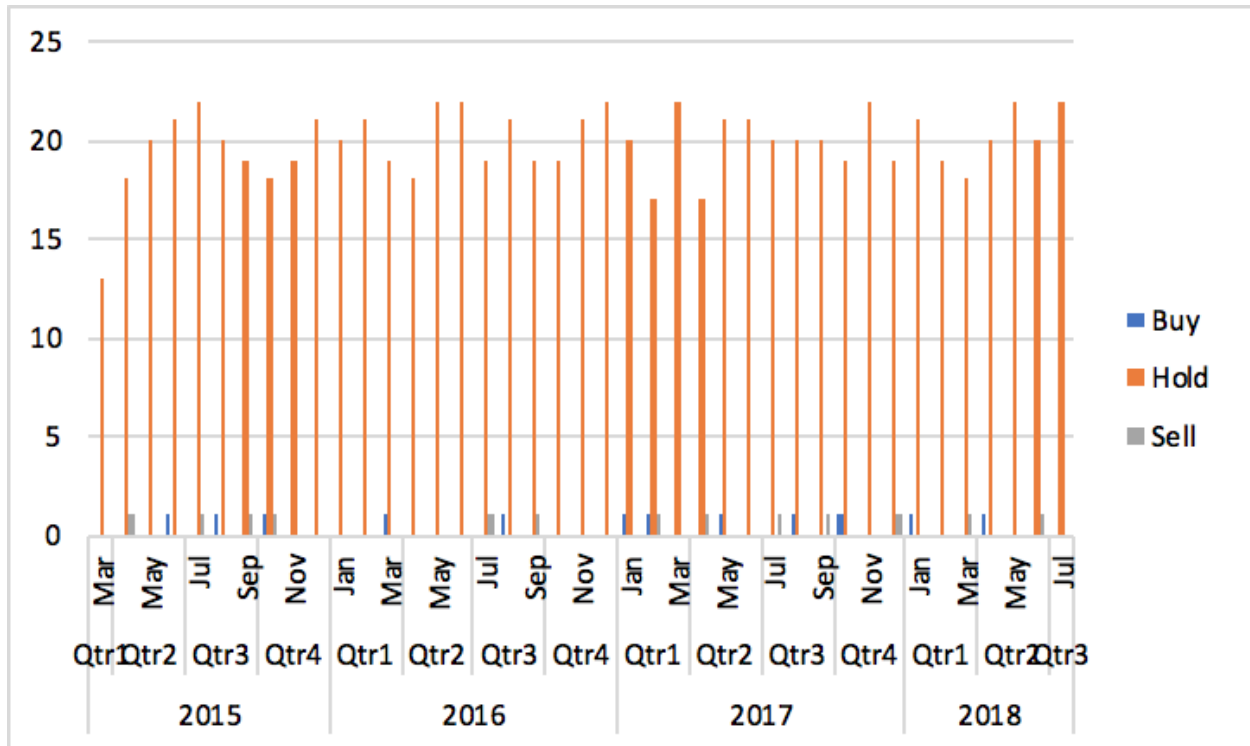
Infosys

Below is the table and chart for variation of signal based on dates. Data used for this is available in Annexure 4



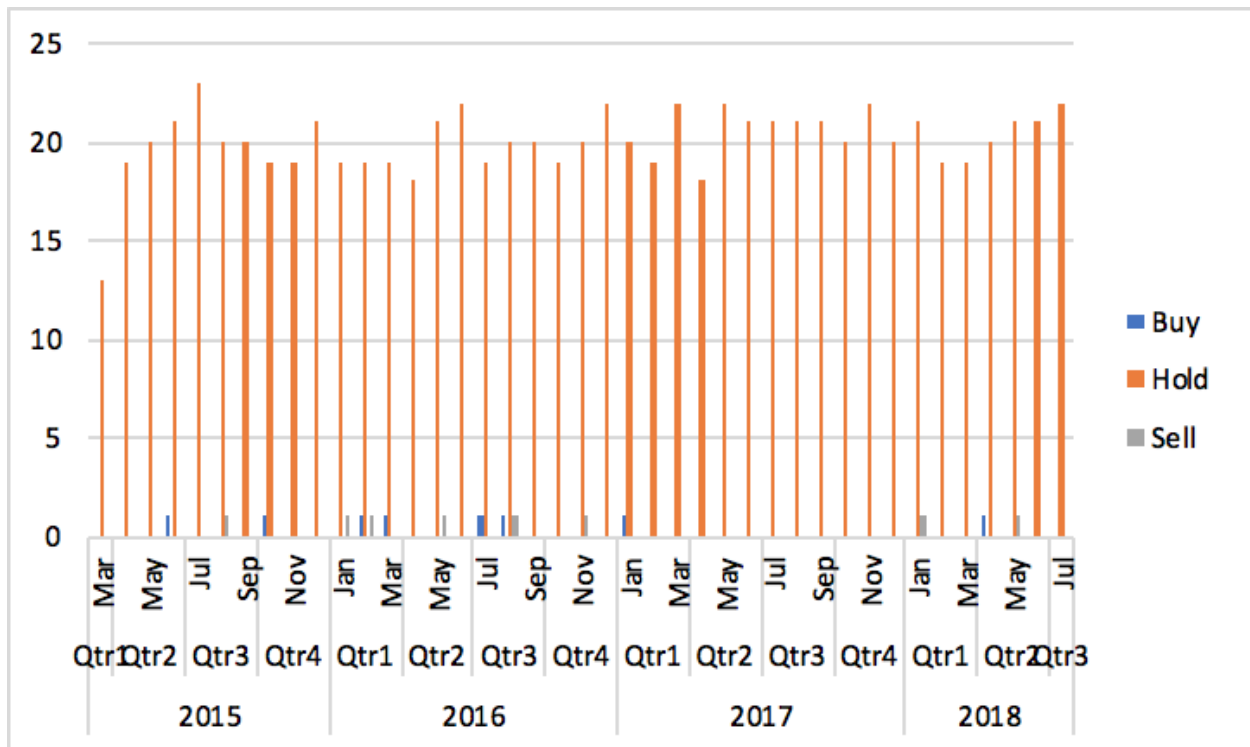
TCS

Below is the table and chart for variation of signal based on dates. Data used for this is available in Annexure 5



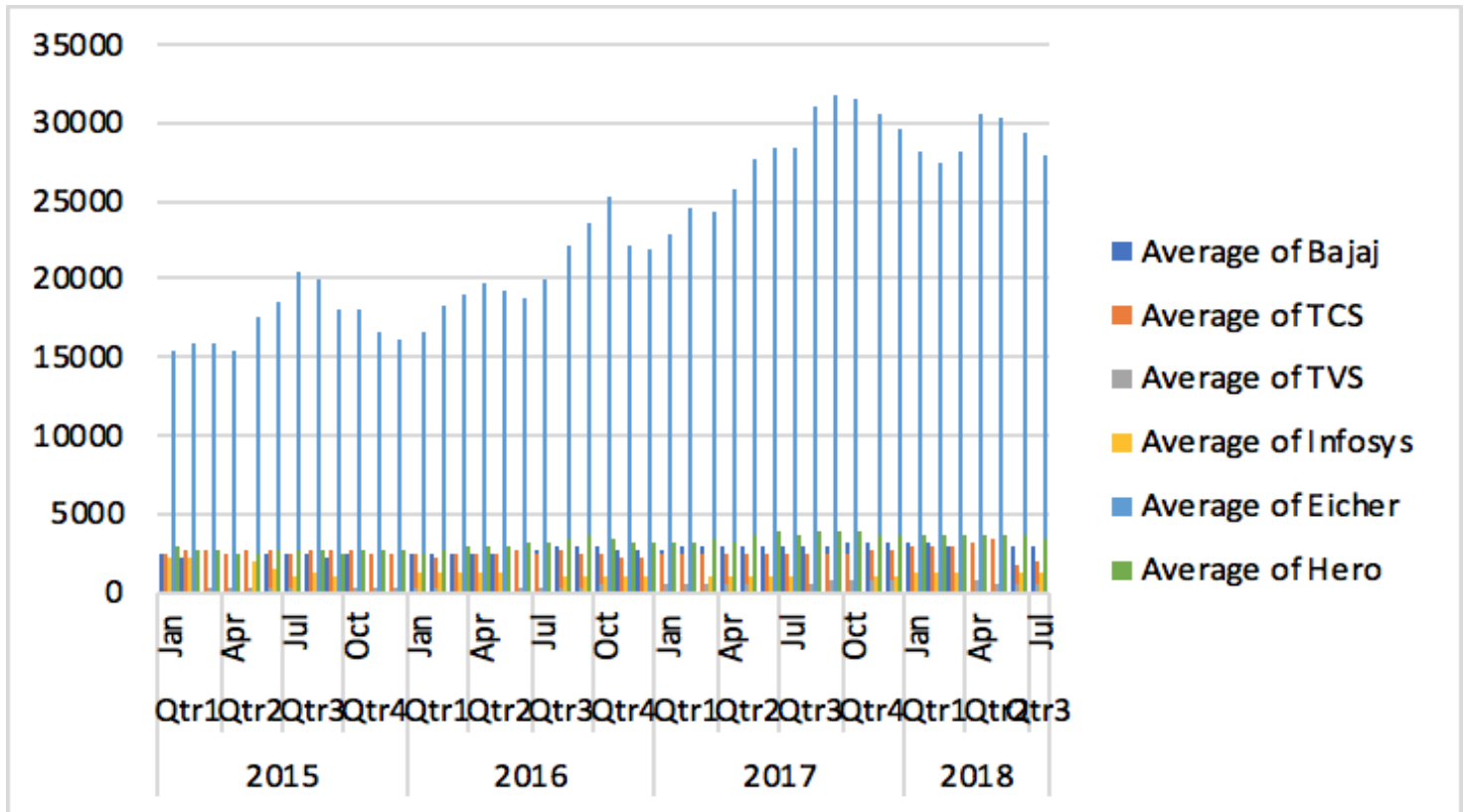
TVS Motors

Below is the table and chart for variation of signal based on dates. Data used for this is available in Annexure 6



Average closing price for all the stocks

Below is the table and chart for variation of signal based on dates. Data used for this is available in Annexure 7



Annexure 1 – Data for Bajaj Auto

Year/Qtr	Buy	Hold	Sell	Total
2015	4	192	3	199
Qtr1		13		13
Mar		13		13
Qtr2	1	60		61
Apr		19		19
May	1	19		20
Jun		22		22
Qtr3		63	1	64
Jul		23		23
Aug		20	1	21
Sep		20		20
Qtr4	3	56	2	61
Oct	1	19		20
Nov		19		19
Dec	2	18	2	22

Year/Qtr	Buy	Hold	Sell	Total
2016	1	244	2	247
Qtr1		60	1	61
Jan		19	1	20
Feb		21		21
Mar		20		20
Qtr2	1	61		62
Apr	1	17		18
May		22		22
Jun		22		22
Qtr3		62		62
Jul		20		20
Aug		22		22
Sep		20		20
Qtr4		61	1	62
Oct		18	1	19
Nov		21		21
Dec		22		22

Year/Qtr	Buy	Hold	Sell	Total
2017	3	241	3	247
Qtr1	1	61		62
Jan	1	20		21
Feb		19		19
Mar		22		22
Qtr2	1	58	2	61
Apr		17	1	18
May	1	21		22
Jun		20	1	21
Qtr3	1	61		62
Jul		21		21
Aug	1	19		20
Sep		21		21
Qtr4		61	1	62
Oct		20		20
Nov		22		22
Dec		19	1	20

Year/Qtr	Buy	Hold	Sell	Total
2018	4	139	3	146
Qtr1	2	56	2	60
Jan	1	20	1	22
Feb	1	17	1	19
Mar		19		19
Qtr2	2	61	1	64
Apr		21		21
May	1	20	1	22
Jun	1	20		21
Qtr3		22		22
Jul		22		22
Grand Total	12	816	11	839

Annexure 2: Eicher Motors

Year/Qtr	Buy	Hold	Sell	Total
2015	1	195	2	198
Qtr1		12	1	13
Mar		12	1	13
Qtr2	1	60		61
Apr		19		19
May	1	19		20
Jun		22		22
Qtr3		63	1	64
Jul		23		23
Aug		20	1	21
Sep		20		20
Qtr4		60		60
Oct		20		20
Nov		19		19
Dec		21		21

Year/Qtr	Buy	Hold	Sell	Total
2016	2	243	2	247
Qtr1	1	60		61
Jan	1	19		20
Feb		21		21
Mar		20		20
Qtr2		61	1	62
Apr		18		18
May		21	1	22
Jun		22		22
Qtr3	1	61		62
Jul	1	19		20
Aug		22		22
Sep		20		20
Qtr4		61	1	62
Oct		19		19
Nov		20	1	21
Dec		22		22

Year/Qtr	Buy	Hold	Sell	Total
2017	2	244	2	248
Qtr1	1	61		62
Jan	1	20		21
Feb		19		19
Mar		22		22
Qtr2		61		61
Apr		18		18
May		22		22
Jun		21		21
Qtr3	1	61	1	63
Jul	1	19	1	21
Aug		21		21
Sep		21		21
Qtr4		61	1	62
Oct		19	1	20
Nov		22		22
Dec		20		20

Year/Qtr	Buy	Hold	Sell	Total
2018	1	144	1	146
Qtr1	1	59		60
Jan		22		22
Feb		19		19
Mar	1	18		19
Qtr2		63	1	64
Apr		21		21
May		22		22
Jun		20	1	21
Qtr3		22		22
Jul		22		22
Grand Total	6	826	7	839

Annexure 3 – Data for Hero Motocorp

Year/Qtr	Buy	Hold	Sell	Total
2015	2	195	1	198
Qtr1		13		13
Mar		13		13
Qtr2	1	60		61
Apr		19		19
May		20		20
Jun	1	21		22
Qtr3		63	1	64
Jul		23		23
Aug		20	1	21
Sep		20		20
Qtr4	1	59		60
Oct	1	19		20
Nov		19		19
Dec		21		21

Year/Qtr	Buy	Hold	Sell	Total
2016	2	242	3	247
Qtr1	1	59	1	61
Jan		19	1	20
Feb		21		21
Mar	1	19		20
Qtr2	1	60	1	62
Apr		18		18
May	1	20	1	22
Jun		22		22
Qtr3		62		62
Jul		20		20
Aug		22		22
Sep		20		20
Qtr4		61	1	62
Oct		18	1	19
Nov		21		21
Dec		22		22

Year/Qtr	Buy	Hold	Sell	Total
2017	3	242	3	248
Qtr1	1	61		62
Jan		21		21
Feb	1	18		19
Mar		22		22
Qtr2	1	59	1	61
Apr		17	1	18
May	1	21		22
Jun		21		21
Qtr3	1	61	1	63
Jul		20	1	21
Aug	1	20		21
Sep		21		21
Qtr4		61	1	62
Oct		19	1	20
Nov		22		22
Dec		20		20

Year/Qtr	Buy	Hold	Sell	Total
2018	2	142	2	146
Qtr1	1	58	1	60
Jan	1	21		22
Feb		18	1	19
Mar		19		19
Qtr2	1	62	1	64
Apr	1	20		21
May		21	1	22
Jun		21		21
Qtr3		22		22
Jul		22		22
Grand Total	9	821	9	839

Annexure 4 – Data for Infosys

Year/Qtr	Buy	Hold	Sell	Total
2015	2	194	3	199
Qtr1		12	1	13
Mar		12	1	13
Qtr2		61		61
Apr		19		19
May		20		20
Jun		22		22
Qtr3	1	62	1	64
Jul		23		23
Aug	1	20		21
Sep		19	1	20
Qtr4	1	59	1	61
Oct	1	19		20
Nov		18	1	19
Dec		22		22

Year/Qtr	Buy	Hold	Sell	Total
2016	2	244	1	247
Qtr1	1	60		61
Jan	1	19		20
Feb		21		21
Mar		20		20
Qtr2		61	1	62
Apr		18		18
May		22		22
Jun		21	1	22
Qtr3		62		62
Jul		20		20
Aug		22		22
Sep		20		20
Qtr4	1	61		62
Oct		19		19
Nov		21		21
Dec	1	21		22

Year/Qtr	Buy	Hold	Sell	Total
2017	4	239	4	247
Qtr1	1	60	1	62
Jan		20	1	21
Feb		19		19
Mar	1	21		22
Qtr2	1	58	2	61
Apr		17	1	18
May		22		22
Jun	1	19	1	21
Qtr3	1	60	1	62
Jul	1	20		21
Aug		19	1	20
Sep		21		21
Qtr4	1	61		62
Oct	1	19		20
Nov		22		22
Dec		20		20

Year/Qtr	Buy	Hold	Sell	Total
2018	1	144	1	146
Qtr1		60		60
Jan		22		22
Feb		19		19
Mar		19		19
Qtr2	1	62	1	64
Apr		20	1	21
May	1	21		22
Jun		21		21
Qtr3		22		22
Jul		22		22
Grand Total	9	821	9	839

Annexure 5 – Data for TCS

Row Labels	Buy	Hold	Sell	Grand Total
2015	3	191	4	198
Qtr1		13		13
Mar		13		13
Qtr2	1	59	1	61
Apr		18	1	19
May		20		20
Jun	1	21		22
Qtr3	1	61	2	64
Jul		22	1	23
Aug	1	20		21
Sep		19	1	20
Qtr4	1	58	1	60
Oct	1	18	1	20
Nov		19		19
Dec		21		21

Year/Qtr	Buy	Hold	Sell	Total
2016	2	243	2	247
Qtr1	1	60		61
Jan		20		20
Feb		21		21
Mar	1	19		20
Qtr2		62		62
Apr		18		18
May		22		22
Jun		22		22
Qtr3	1	59	2	62
Jul		19	1	20
Aug	1	21		22
Sep		19	1	20
Qtr4		62		62
Oct		19		19
Nov		21		21
Dec		22		22

Year/Qtr	Buy	Hold	Sell	Total
2017	5	238	5	248
Qtr1	2	59	1	62
Jan	1	20		21
Feb	1	17	1	19
Mar		22		22
Qtr2	1	59	1	61
Apr		17	1	18
May	1	21		22
Jun		21		21
Qtr3	1	60	2	63
Jul		20	1	21
Aug	1	20		21
Sep		20	1	21
Qtr4	1	60	1	62
Oct	1	19		20
Nov		22		22
Dec		19	1	20

Year/Qtr	Buy	Hold	Sell	Total
2018	2	142	2	146
Qtr1	1	58	1	60
Jan	1	21		22
Feb		19		19
Mar		18	1	19
Qtr2	1	62	1	64
Apr	1	20		21
May		22		22
Jun		20	1	21
Qtr3		22		22
Jul		22		22
Grand Total	12	814	13	839

Annexure 6 – Data for TVS Motors

Year/Qtr	Buy	Hold	Sell	Total
2015	2	195	1	198
Qtr1		13		13
Mar		13		13
Qtr2	1	60		61
Apr		19		19
May		20		20
Jun	1	21		22
Qtr3		63	1	64
Jul		23		23
Aug		20	1	21
Sep		20		20
Qtr4	1	59		60
Oct	1	19		20
Nov		19		19
Dec		21		21

Year/Qtr	Buy	Hold	Sell	Total
2016	4	238	5	247
Qtr1	2	57	2	61
Jan		19	1	20
Feb	1	19	1	21
Mar	1	19		20
Qtr2		61	1	62
Apr		18		18
May		21	1	22
Jun		22		22
Qtr3	2	59	1	62
Jul	1	19		20
Aug	1	20	1	22
Sep		20		20
Qtr4		61	1	62
Oct		19		19
Nov		20	1	21
Dec		22		22

Year/Qtr	Buy	Hold	Sell	Total
2017	1	247		248
Qtr1	1	61		62
Jan	1	20		21
Feb		19		19
Mar		22		22
Qtr2		61		61
Apr		18		18
May		22		22
Jun		21		21
Qtr3		63		63
Jul		21		21
Aug		21		21
Sep		21		21
Qtr4		62		62
Oct		20		20
Nov		22		22
Dec		20		20

Year/Qtr	Buy	Hold	Sell	Total
2018	1	143	2	146
Qtr1		59	1	60
Jan		21	1	22
Feb		19		19
Mar		19		19
Qtr2	1	62	1	64
Apr	1	20		21
May		21	1	22
Jun		21		21
Qtr3		22		22
Jul		22		22
Grand Total	8	823	8	839

Annexure 7 – Data for Avg. Closing Price of All Stocks

Year / Qtr	Average of Bajaj	Average of TCS	Average of TVS	Average of Infosys	Average of Eicher	Average of Hero
2015	2328.191903	2538.084615	258.7738866	1550.007287	17391.45587	2602.165385
Qtr1	2233.624194	2568.556452	288.541129	2190.766129	15739.40242	2763.979839
Jan	2414.283333	2508.414286	298.5761905	2090.519048	15316.81429	2932.535714
Feb	2230.745	2588.59	290.4625	2256.1	16004.995	2733.08
Mar	2055.707143	2609.619048	276.6761905	2228.790476	15909.04524	2624.852381
Qtr2	2200.498361	2550.935246	234.2786885	1839.49918	17231.9418	2508.760656
Apr	2035.423684	2535.557895	243.1684211	2124.615789	15432.15789	2466.884211
May	2194.005	2547.6325	228.3175	1987.45	17557.3375	2507.705
Jun	2348.965909	2567.218182	232.0204545	1458.761364	18490.48636	2545.886364
Qtr3	2417.964063	2568.814844	238.2703125	1074.74375	19546.18047	2526.41875
Jul	2531.593478	2540.354348	256.2913043	1018.784783	20429.88043	2617.75
Aug	2435.678571	2610.240476	228.3690476	1111.82619	19953.34286	2589.47381
Sep	2268.69	2558.0475	227.9425	1100.16	18102.405	2355.18
Qtr4	2459.976667	2460.753333	274.7883333	1100.520833	16962.3775	2610.715
Oct	2470.8475	2562.235	247.005	1135.2525	18156.795	2567.2375
Nov	2432.086842	2425.539474	292.1736842	1088.728947	16530.96053	2624.039474

Dec	2474.85714 3	2395.96428 6	285.519047 6	1078.11190 5	16215.1666 7	2640.06666 7
2016	2607.05485 8	2418.99554 7	320.206072 9	1100.68724 7	20522.2510 1	3055.42085
Qtr1	2340.15983 6	2339.17131 1	287.113934 4	1134.18606 6	17984.3532 8	2635.09016 4
Jan	2358.55	2327.1775	284.1425	1106.88	16626.32	2515.81
Feb	2348.09523 8	2298.29523 8	281.530952 4	1123.76428 6	18256.2666 7	2564.46904 8
Mar	2313.4375	2394.085	295.9475	1172.435	19056.8775	2828.5225
Qtr2	2534.40403 2	2535.15	303.205645 2	1208.17983 9	19185.5395 2	3000.77258 1
Apr	2478.11388 9	2479.06388 9	322.980555 6	1210.63888 9	19734.9388 9	2982.42777 8
May	2496.00681 8	2530.00909 1	295.947727 3	1209.02272 7	19147.1590 9	2935.55227 3
Jun	2618.85681 8	2586.17954 5	294.284090 9	1205.325	18774.4113 6	3081.00227 3
Qtr3	2831.44032 3	2513.43951 6	314.437096 8	1072.99435 5	21916.2983 9	3363.86290 3
Jul	2680.985	2501.0675	300.95	1122.695	19900.2625	3214.75
Aug	2864.88636 4	2622.07045 5	305.261363 6	1053.35454 5	22141.125	3345.77727 3
Sep	2945.105	2406.3175	338.0175	1044.8975	23685.025	3532.87
Qtr4	2717.91048 4	2286.93387 1	375.533871	987.929032 3	22961.8790 3	3215.17822 6
Oct	2821.42894 7	2391.41842 1	392.6	1027.38421 1	25173.4921 1	3420.56315 8
Nov	2685.88333 3	2219.06666 7	369.876190 5	951.573809 5	22143.0523 8	3120.21666 7

Dec	2659.07954 5	2261.47954 5	366.195454 5	988.556818 2	21833.4568 2	3128.44545 5
2017	2938.96214 6	2475.27004	560.557692 3	962.723076 9	28058.3518 2	3559.8917
Qtr1	2796.47096 8	2389.83064 5	409.238709 7	990.053225 8	23788.8798 4	3198.22822 6
Jan	2732.15952 4	2312.82381	383.826190 5	965.288095 2	22769.0023 8	3096.34761 9
Feb	2796.48421 1	2367.33421 1	412.473684 2	975.473684 2	24432.4368 4	3188.23421 1
Mar	2857.84772 7	2482.76590 9	430.702272 7	1026.28409 1	24206.6	3304.10909 1
Qtr2	2859.51393 4	2422.71393 4	514.482786 9	951.268032 8	27427.8549 2	3520.98032 8
Apr	2834.66388 9	2350.11944 4	475.575	946.408333 3	25817.2027 8	3231.51666 7
May	2906.05681 8	2444.20681 8	518.384090 9	957.059090 9	27763.725	3523.87045 5
Jun	2832.05476 2	2462.42142 9	543.745238 1	949.366666 7	28456.55	3766.06428 6
Qtr3	2869.20967 7	2472.29354 8	598.212903 2	942.523387 1	30437.9758 1	3839.83548 4
Jul	2798.23809 5	2441.6	568.242857 1	974.454761 9	28472.5119	3720.92142 9
Aug	2804.94	2494.785	586.2575	954.6175	31037.3275	3913.3625
Sep	3001.39047 6	2481.56666 7	639.569047 6	899.073809 5	31832.6285 7	3888.72381
Qtr4	3229.37258 1	2615.39435 5	719.553225 8	966.862903 2	30568.5274 2	3679.89516 1
Oct	3201.7375	2535.6275	689.4175	928.0275	31522.5275	3761.915
Nov	3246.50454 5	2687.41818 2	713.072727 3	962.529545 5	30654.7818 2	3664.85909 1

Dec	3238.1625	2615.935	756.8175	1010.465	29519.6475	3614.415
2018	2953.42568	2729.11506	631.932191	1191.39965	28798.7804	3590.04794
	5	8	8	8	8	5
Qtr1	3093.45583	2933.50916	679.8275	1130.3325	27870.0733	3599.4975
	3	7			3	
Jan	3256.50909	2880.18409	738.556818	1101.27045	28031.9704	3674.51818
	1	1	2	5	5	2
Feb	3103.98157	3009.04210	657.752631	1132.73947	27524.0210	3558.95263
	9	5	6	4	5	2
Mar	2894.13157	2919.72105	633.9	1161.57631	28028.6657	3553.17631
	9	3		6	9	6
Qtr2	2836.225	2806.44296	611.811718	1199.46718	30015.1335	3649.12421
		9	8	8	9	9
Apr	2833.11666	3175.44047	657.678571	1148.05714	30444.9023	3732.16428
	7	6	4	3	8	6
May	2823.925	3417.66363	599.581818	1193.23409	30202.4431	3594.97954
		6	2	1	8	5
Jun	2852.21904	1797.11904	578.757142	1257.40714	29389.1357	3622.80714
	8	8	9	3	1	3
Qtr3	2912.47272	1946.72272	559.840909	1334.47727	27793.1363	3392.41818
	7	7	1	3	6	2
Jul	2912.47272	1946.72272	559.840909	1334.47727	27793.1363	3392.41818
	7	7	1	3	6	2
Tota	2678.83850	2518.87407	421.339233	1202.32074	23111.2970	3157.68213
I	1		4	4	1	1