

Trend Analysis of IT shares under NIFTY IT Index

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Abstract:

One of the sectors which has gone through a tremendous change in past 25 years. Since the inception of NIFTY IT Index in 1996 with 1000 base value which was later revised to 100 in 2004, the index is currently trading around 25,000 index value approximately. It has gone through the tough times and good times in patches. Despite so many constraints Indian IT Companies has made their mark felt in International arena. It can be due to cheap labor force, highly qualified professionals, government policies for foreign investment, etc. Outsourcing is one big segment which has helped the IT companies to sustain themselves in the competitive environment.

In the year 1988, NASSCOM was set up in the financial capital of Mumbai to encourage the growth of IT and ITES in India. Services in hardware, software, networking, training, etc started flourishing in India during this point in time. Companies of developed economy started collaborating with the Indian companies for IT services.

The objective for the study is to basically understand the conceptual understanding about the different techniques for predicting the future prices of IT Stocks.

Key Words: Stock Market, IT Companies, MACD, ROC, RSI

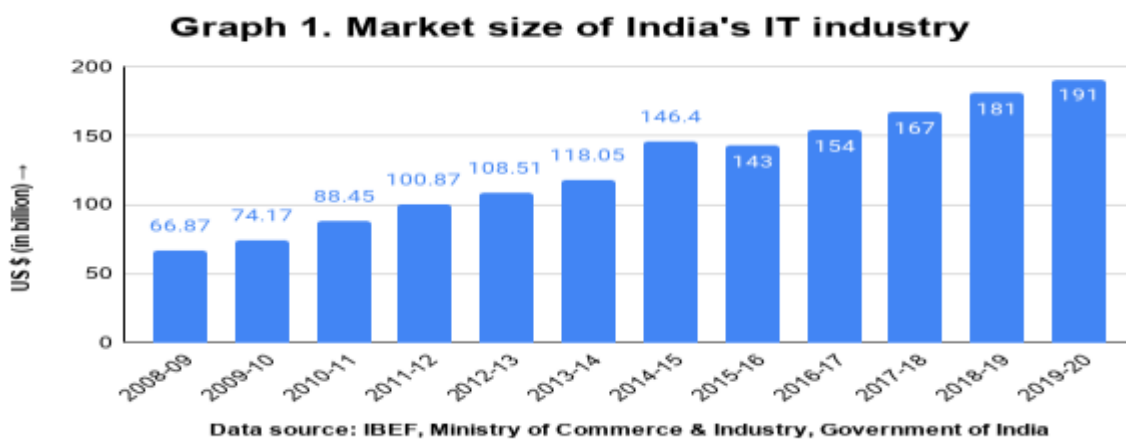
Introduction:

Government played a key role in the development and expansion of the IT industry. IT hubs were developed in cities such as Hyderabad, Secundarabad, Pune, Bangalore and Mumbai. Few segments in which India IT Industry was making a tremendous move were BPO (business process outsourcing), Legal Process Outsourcing (LPO) and Knowledge Process Outsourcing (KPO). It was during the 1990s that the Indian government introduced a telecommunication policy as well as other innovative initiatives for offshore outsourcing.

Since the Y2K boom Government policy reforms as well as a good base in technical education and market requirements have made information technology expand further during this time period. During this period, client morale received a huge boost and entrepreneurs realized that this industry still had the potential to grow further. India has emerged as a pioneer in the area of outsourcing and information technology in the 21st century. Currently, India is poised to enter a new phase of growth as the outsourcing industry grows further and

the information technology market undergoes new developments. India's IT and outsourcing industry's success is a potential instrument for attracting more investment in this sector. For an increasing population, it is also perfect for creating employment.

Across the world's economies, the development of the IT industry in India is unprecedented. In the past two decades, all the sub-sectors of this industry (hardware products have seen relatively less development) have made progress in revenue growth and fuelled the Indian economy's growth. The rapid progress made by the Government of India in the IT industry and liberalization policies, such as the reduction of trade barriers and the abolition of import duties on technology goods, are instrumental in the growth of this sector. Various other government initiatives, such as the establishment of Software Technology Parks (STP), Export Focused Units (EOU), Special Economic Zones (SEZ) and Foreign Direct Investment (FDI), have also enabled this sector to achieve a dominant role in the IT industry worldwide.



In the present period, since the COVID-19 pandemic has struck the entire globe, economies have been hit hard. The Indian IT sector continues to display optimistic signs and has the capacity to resolve this unparalleled tragedy. It has emerged as a global economic force and a major contributor, especially to the Indian economy and to the world in general.

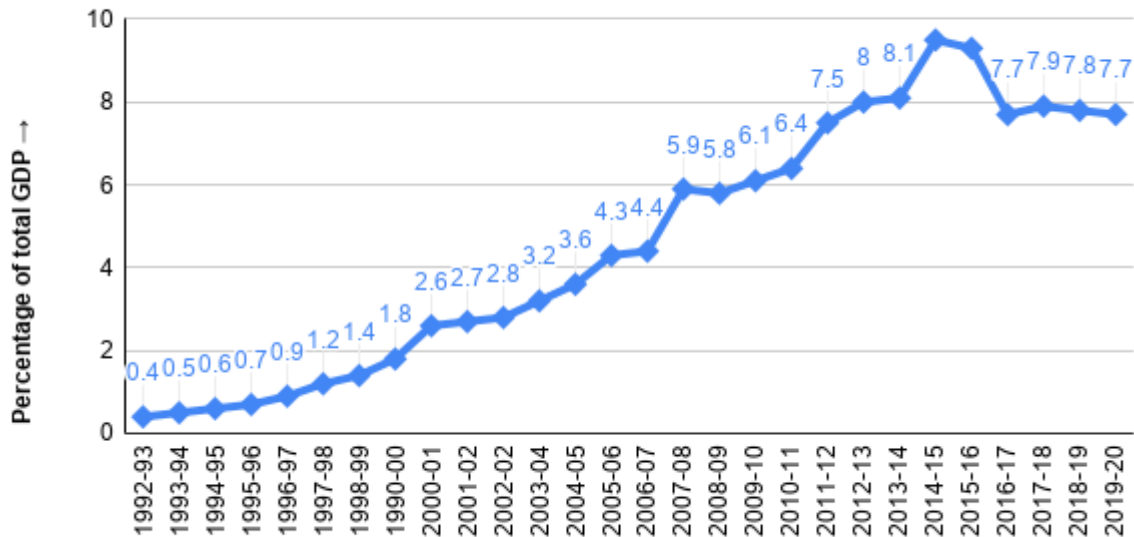
Contribution of IT Industry in India's Growth:

With an exponential growth rate, the Indian IT industry developed rapidly after the 1991-92 economic reform. Thousands of centers in India and about 80 countries around the world have been set up by Indian IT firms. IT-ITES is imported from the Indian IT industry by the majority of global firms, accounting for approximately 55 percent of the global service sourcing market (US\$ 200-250 billion) in 2019-20. The size of the market (particularly exports) for the IT industry has increased by a multiple of approx. US \$67 billion in 2008-09 to US \$191 billion in 2019-20 (Graph 1). With an accelerating growth rate, revenue is projected to rise further in the coming years and is expected to hit US\$ 350 billion by 2025.

The remarkable aspect of India's IT industry is that it is also steadily contributing a significant share to India's gross domestic product (GDP) along with its expansion in terms of

market size, thereby boosting the country's growth and development. The IT industry contributed about eight percent to India's total GDP in 2017-18, from a minuscule 0.4 percent in 1991-92 (Graph 2). By 2025, this share is projected to grow to ten percent.

Graph 2. IT industry's share in GDP (in %)



Data source: IBEF, Ministry of Commerce & Industry, Government of India

Over the time, India's digitally eligible pool has expanded and accounted for about 75 percent of worldwide digital talent. More than one million jobs are employed by India's four big IT companies (TCS, Infosys, Wipro, HCL Tech). In the digital economy, new IT-based technologies, such as telemedicine, remote monitoring, etc., are growing and boosting demand. The introduction of communication technology of the fifth generation (5G), the the adoption of artificial intelligence, Big Data analytics, cloud computing and the Internet of Things (IoT) would further increase the scale of India's IT industry. IT companies are building their centers in Tier II and Tier III cities as the scale of India's digital economy increases, which will further enhance growth and reduce existing inequalities.

Objective of the Research:

To identify the market trend in the selected shares of the IT Companies in NIFTY IT Index on the basis of MACD, ROC and RSI Oscillators.

Scope of the Research:

The research is based on the shares of 3 IT companies – Tata Consultancy Services Ltd., Infosys Ltd and Wipro Ltd.

The research is based on three oscillators – MACD, ROC and RSI.

The research is based on the share prices of one year from 1st April 2009 to 31st March, 2019 on monthly closing price basis.

MACD is calculated by taking a short-term moving average of 12 days and long-term moving average of 26 days.

ROC has been calculated by taking 14 days.

RSI has been calculated by taking 14 days.

Research Methodology:

Research Type: Empirical

Type of Sampling: Convenient Sampling

Sampling Unit: IT Companies in India

Sampling Universe: IT Shares that are listed in NIFTY IT Index

Data Type: Secondary

Data Source: www.nseindia.com

MACD (Moving Average Convergence Divergence)

It is one of the simplest tools to predict movements in the market. As analyst is generally in a dilemma, whether to use long-term moving average or short-term moving average, the solution for such dilemma is to use MACD. MACD is the difference between short-term moving average and long-term moving average. This difference helps in identifying, whether prices in the recent past have moved upward or downward as compared to longer period movement. With the help of MACD line, various signals can be generated.

MACD = Short Period Moving Average – Long Period Moving Average

Simple buy and sell signals can be generated with the help of MACD. When MACD is in positive zone, it indicates buying as share prices are likely to move upward in the future, on the contrary, when MACD is in negative zone, it indicates southward movement of the market in the near future and one should sell the shares.

Buying Signals: Whenever, MACD line is above the moving average line of MACD; MACD line moves towards average line and thereafter reverts towards upside. It is a buy signal.

Whenever MACD line is below the average line and penetrates the average line towards upside, thereafter both the lines continue to move upward; it is a buy signal.

Selling Signals: Whenever MACD line is below the line of moving average. At this point MACD moves towards average line but fails to break through it, instead starts moving towards downside; it is a sell signal.

ROC (Rate of Change)

In calculating ROC, current days' market price is divided by the price which had prevailed few days ago for the share. The value achieved so, is identified as 'Rate of Change' indicating whether prices at present are moving upward or downward as compared to the prices, which prevailed few days ago.

ROC is an indicator, which helps in identifying 'Over Bought' and 'Over Sold' market. With the help of ROC, buying and selling signals are generated much before the market makes a movement. Generally, ten days (values) ROC is calculated on rolling basis, that is eleventh day's price is divided by first day's price and twelfth day's price is divided by second day's price and so on.

Buying Signals: When ROC is more than one ($ROC > 1$) and moving upward continuously, it indicates market is likely to move upward.

When ROC is less than one ($ROC < 1$) and moving upward continuously, it indicates that market has come out of the red and in the near future, it is expected to have a northward (upward) movement.

When ROC is moving downside but the pace of decline has decreased, it indicates that market is likely to reach 'over sold' level and after that, it will start rising; an opportunist who can take a risk, can buy at this level.

Selling Signals: When ROC line is increasing but the pace has declined, it indicates that market is about to reach the 'over bought' zone, after which it is likely to decline. One should take a precaution or a risk averse investor can sell at this moment.

When ROC line has made a peak, it is the identification of 'over bought' market and market is likely to move towards southward (downward) direction, one should sell.

When ROC is more than one ($ROC > 1$) but declining, it indicates that market will enter in south zone, i.e., declining zone, and one should sell at this level.

RSI (Relative Strength Index)

Relative Strength Index (RSI) is one of the powerful oscillators, which indicates market movement much before such movement takes place. Under RSI, gains and losses of prices over the immediate previous days' price for a certain period is calculated. With the help of the formula RSI value is calculated and plotted on the graph to identify over bought and over sold market. Market always moves southward after an over bought situation and it moves northward after an over sold situation.

When RSI value is at or above 70-level and moving upward, it indicates that market is likely to reach the peak due to over bought position, on the contrary, when RSI value is at or below 30-level, it indicates an over sold situation and the market is likely to bottom out. In between 50-level of RSI is used to generate confirm and safe signals. Market always moves southward after an over bought situation and it moves northward after an over sold situation.

Calculation of RSI

$$RSI = 100 - 100/(1+RS)$$

Where,

$$RS = \text{Average of 'n' days advance} / \text{Average of 'n' days decline}$$

RSI is one of the sophisticated oscillators used by technical analysts. Using 10 days ROC is risky, as it generates abrupt signals. At the same time other oscillators do not have upper and lower limits for decision making; this makes the prediction a tough task. In RSI '0' is the lower limit & 100 is the upper limit and 30 as well as 70 are the critical levels.

Value 50 is the benchmark.

Value 70 is used to identify overbought market

Value 30 is used to identify oversold market

Generating signals with the help of RSI

With the help of RSI, market can be identified as 'over bought' or 'over sold', this identification helps in generating buying and selling signals. RSI value is plotted on a graph and this oscillates above or below a central value that is FIFTY '50' mark. Here RSI value FIFTY '50' is the benchmark value. Buying and selling signals are generated as follows:

Buying Signals: When RSI is more than 50 and moving upward continuously, it indicates that the market is likely to move upward.

When RSI line is less than 50 and moving upward continuously, it indicates that market has come out of the red and in the near future, it is expected to have a northward (upward) movement.

When RSI is moving downside below the 50 mark, but the pace of decline has decreased, it indicates that market is likely to reach 'over sold' level and after that, it will start rising; an opportunist who can take risk, can buy at this level.

Selling signals: When RSI line is increasing above the 50 mark but the pace of increase has declined, it indicates that market is about to reach the over bought zone, after which, it is likely to decline. One should take precaution at this level; or a risk averse investor should wait for more clear signals.

When RSI line has made a peak at around 70-level, it is the identification of 'over bought' market, and market is likely to move southward (downward) direction, so one should sell.

When RSI is more than 50, but declining, it indicates that the market will slump and one should sell at this level.

Limitation:

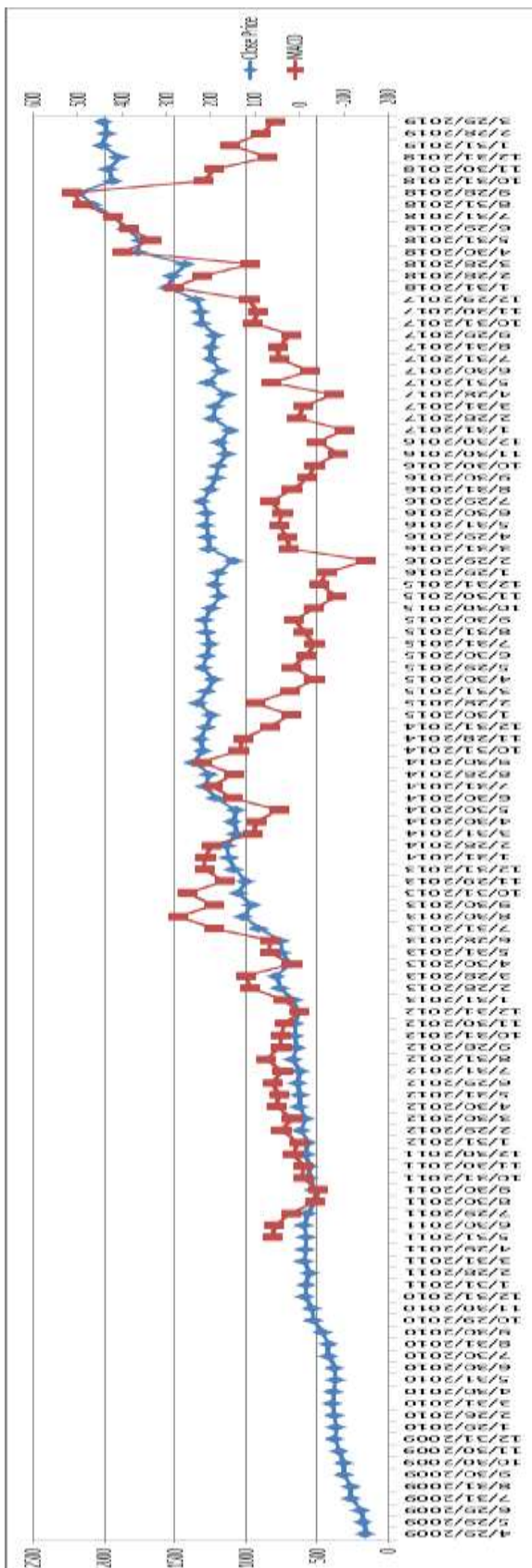
- The share price gets affected by other factors also such as political, economic, fundamental etc. which might not get reflected in the analysis.
- The duration of study is only one year.
- Due to time constraint, all the shares are evaluated on the basis of only three oscillators in this research paper.
- Only five shares have been chosen for trend analysis based on the market capitalization.

TCS

Date	Close Price	MACD	ROC	RSI
4/29/2009	155.9			
5/29/2009	176.15			
6/29/2009	193.1			
7/31/2009	262.975			
8/31/2009	263.525			
9/30/2009	310.5			
10/30/2009	314.15			
11/30/2009	344.2			
12/31/2009	375.125			
1/29/2010	368.1			
2/26/2010	380.9			
3/31/2010	390.325			
4/30/2010	382.7			
5/31/2010	371.525		2.38309814	90.3376672
6/30/2010	375.5		2.131705932	90.47926267
7/30/2010	419.9		2.174520974	91.90604771
8/31/2010	421.875		1.604239947	91.96373908
9/30/2010	463.475		1.758751542	93.08221832
10/29/2010	526.45		1.695491143	94.36157404
11/30/2010	538		1.712557695	94.56027497
12/31/2010	582.825		1.693274259	95.25861962
1/31/2011	579.75		1.545484838	94.36365243
2/28/2011	555.125		1.508082043	87.29091286
3/31/2011	591.95		1.554082436	88.65976398
4/29/2011	582.825		1.493178761	86.18270259
5/31/2011	578.575	60.55417	1.511823883	84.99166011
6/30/2011	592.1	56.02917	1.593701635	85.67035653
7/29/2011	568.5	20.04583	1.513981358	78.9605147
8/30/2011	521.2	-35.5312	1.241247916	67.54245362
9/30/2011	518.65	-42.6792	1.229392593	66.98012258
10/31/2011	557.9	-6.05	1.203732672	70.98445494
11/30/2011	557.775	-7.82292	1.059502327	70.95494337
12/30/2011	580.325	14.93542	1.078671004	73.12559059
1/31/2012	566.2	1.939583	0.971475143	69.61602907
2/29/2012	610.975	42.06042	1.053859422	73.89330434
3/30/2012	584.4	16.11458	1.05273587	67.79327858
4/30/2012	623.3	51.64167	1.052960554	71.50183197
5/31/2012	622.675	47.34167	1.068373869	71.35965611
6/29/2012	638.725	59.50625	1.103962321	72.85251254
7/31/2012	621.825	38.1625	1.050202668	68.78675932

8/31/2012	671.875	75.65625	1.181838171	73.50299342
9/28/2012	647.95	40.95625	1.243188795	68.19827393
10/31/2012	657.75	42.43542	1.268196279	69.17947112
11/30/2012	657	33.41667	1.1776304	69.00400238
12/31/2012	627.925	0.375	1.125767559	62.39665732
1/31/2013	672.075	35.70208	1.158101064	67.48759186
2/28/2013	758.5	109.8333	1.339632639	74.70652376
3/28/2013	787.875	122.2521	1.289537215	76.60768997
4/30/2013	689.2	18.08542	1.179329227	60.23042316
5/31/2013	749.225	67.56458	1.20202952	65.11589347
6/28/2013	759.075	67.38542	1.219054884	65.85710889
7/31/2013	907.75	192.2333	1.421190653	74.62221168
8/30/2013	1016.6	272.3563	1.634865115	78.89422988
9/30/2013	963.9	193.3271	1.43464186	72.52841001
10/31/2013	1056.025	252.2625	1.629793966	76.15108446
11/29/2013	1002.175	169.6479	1.523641201	70.31419571
12/31/2013	1086.025	215.3229	1.653006088	73.69517688
1/31/2014	1120.525	212.4521	1.784488593	74.95888924
2/28/2014	1137.875	198.1875	1.69307741	75.59389318
3/31/2014	1066.575	103.6625	1.406163481	67.966242
4/30/2014	1094.6	97.90417	1.389306679	69.27840748
5/30/2014	1070.675	47.19167	1.553504063	66.76412042
6/30/2014	1212.7	151.4146	1.618605893	73.02313518
7/31/2014	1290.025	196.8833	1.699469749	75.70565983
8/28/2014	1261.175	147.6521	1.389341779	72.79710712
9/30/2014	1368.3	221.0771	1.345957112	76.41975848
10/31/2014	1303.925	136.0438	1.352759622	70.35623415
11/28/2014	1321.5	127.0083	1.251390829	71.03200685
12/31/2014	1279.125	68.54167	1.276348941	67.06241787
1/30/2015	1241.025	20.4	1.142722313	63.61983846
2/28/2015	1337.625	100.3542	1.193748466	68.092214
3/31/2015	1276.975	22.17083	1.122245414	62.86665944
4/30/2015	1231.85	-34.3917	1.154958629	59.22490706
5/29/2015	1305.15	19.36875	1.192353371	62.97668224
6/30/2015	1275.475	-15.5375	1.191281201	60.54777209
7/31/2015	1255.375	-32.75	1.035190072	58.89097089
8/31/2015	1282.025	-7.8375	0.99379857	60.4367589
9/30/2015	1294.025	10.35208	1.026047139	61.14523582
10/30/2015	1247.6	-31.3792	0.911788351	56.90000326
11/30/2015	1182.35	-85.0333	0.906762275	51.48912615
12/31/2015	1218.425	-43.9	0.922001513	54.08860549
1/29/2016	1195.65	-62.8938	0.934740545	52.18731297
2/29/2016	1088.4	-149.375	0.877016982	44.29164985

3/31/2016	1260.15	23.77708	0.942080179	55.81929173
4/29/2016	1267.75	28.38542	0.992775896	56.25070428
5/31/2016	1284.7	47.03958	1.042902951	57.25324957
6/30/2016	1276.55	38.8	0.97808681	56.58184754
7/29/2016	1309.65	67.37708	1.02679394	58.70014109
8/31/2016	1255.65	15.575	1.000219058	54.06580106
9/30/2016	1215.4	-18.1229	0.948031435	50.84367524
10/30/2016	1195.525	-33.6583	0.923880914	49.28184876
11/30/2016	1138.025	-87.4646	0.912171369	44.97723682
12/30/2016	1182.775	-39.7437	1.000359454	48.73055602
1/31/2017	1114.9	-100.89	0.915033753	43.84519567
2/28/2017	1233.125	5.275	1.031342784	52.73373995
3/31/2017	1215.9	-8.2625	1.117144432	51.45579368
4/28/2017	1136.575	-76.6563	0.901936277	45.93498005
5/31/2017	1273.3	61.01875	1.004377835	54.91407086
6/30/2017	1181.175	-23.1583	0.919416985	49.0080173
7/31/2017	1245.9	46.87917	0.975989973	52.84525239
8/31/2017	1248.175	49.77708	0.953059978	52.97918942
9/29/2017	1217.975	19.3625	0.96999562	50.91188413
10/31/2017	1312	103.6813	1.079480007	56.59122481
11/30/2017	1318.5	95.14167	1.102862759	56.96193032
12/29/2017	1350.6	113.2563	1.186792909	58.83171107
1/31/2018	1556.175	282.0583	1.315698252	68.32311268
2/28/2018	1517.525	219.7083	1.361131043	65.27602389
3/28/2018	1424.575	109.3688	1.155255955	58.51699839
4/30/2018	1766.05	398.3875	1.452463196	70.57235582
5/31/2018	1741.05	334.4083	1.531839078	68.99157465
6/29/2018	1847.75	385.5604	1.451150554	71.8860394
7/31/2018	1940.2	420.1521	1.642601647	74.13855839
8/31/2018	2078.4	489.1667	1.668191669	77.09315092
9/28/2018	2183.7	513.9896	1.749514291	79.05650667
10/31/2018	1938.15	216.2604	1.59128882	65.05405008
11/30/2018	1968.25	192.2146	1.500190549	65.8524804
12/31/2018	1893.05	71.81042	1.435760334	62.03883896
1/31/2019	2014.1	154.7	1.491263142	65.5021492
2/28/2019	1983.45	85.22292	1.274567449	63.91219001
3/29/2019	2001.65	55.33333	1.319022751	64.4637936



Conclusion: (MACD TCS)

MACD of TCS made a low on 29.02.2016 and a peak on 28.09.2018. A steady growth pattern has been observed over the past 10 years data.

1. When MACD line is above zero mark having upward trend, it indicates the signal of bullish market for the scrip and the prices will be increasing ahead:

28.06.13 to 30.08.13 28.03.18 to 28.09.18

2. When MACD mark is above zero mark having downward trend, it indicates the signal of bearish market for the scrip and the prices will be decreasing ahead:

31.12.13 to 30.05.14 30.09.14 to 30.01.15

29.07.16 to 30.11.16 28.09.18 to 31.12.18

3. When MACD line is below zero mark line but rising it gives signals of a bullish trend:

29.02.16 28.04.17

4. When MACD line below zero mark line, having downward trend, prices will be decreasing ahead:

31.12.13

5. When MACD line forms a peak at the top, it

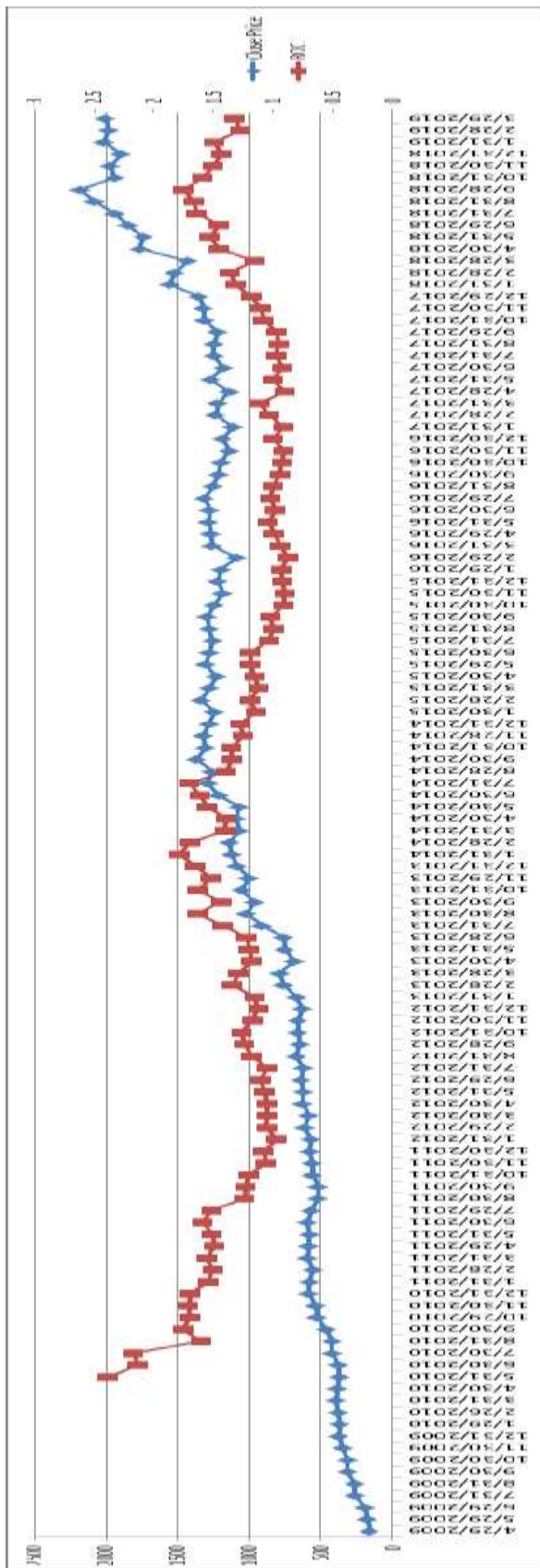
gives signals that the market will soon turn bearish, i.e., it represent overbought situation:

28.09.18

6. When MACD reaches it bottom, it signifies oversold situation, i.e., the market will start

becoming bullish:

29.02.16



Conclusion: (ROC TCS):

1. On the following instances, ROC line touches its peak. Points of overbought market for the scrip, i.e., prices will decline ahead:

31.05.10 31.01.14 31.07.14

28.09.18

2. On the following instances, ROC line touches its bottom. Points of oversold market for the scrip and the prices will be increasing:

28.06.13 28.04.17 28.03.18

3. During the following intervals, ROC line declined from its extreme towards one mark line, which signifies bearish trend in the market for the scrip:

31.05.10 to 31.01.12 31.07.14 to 30.10.15

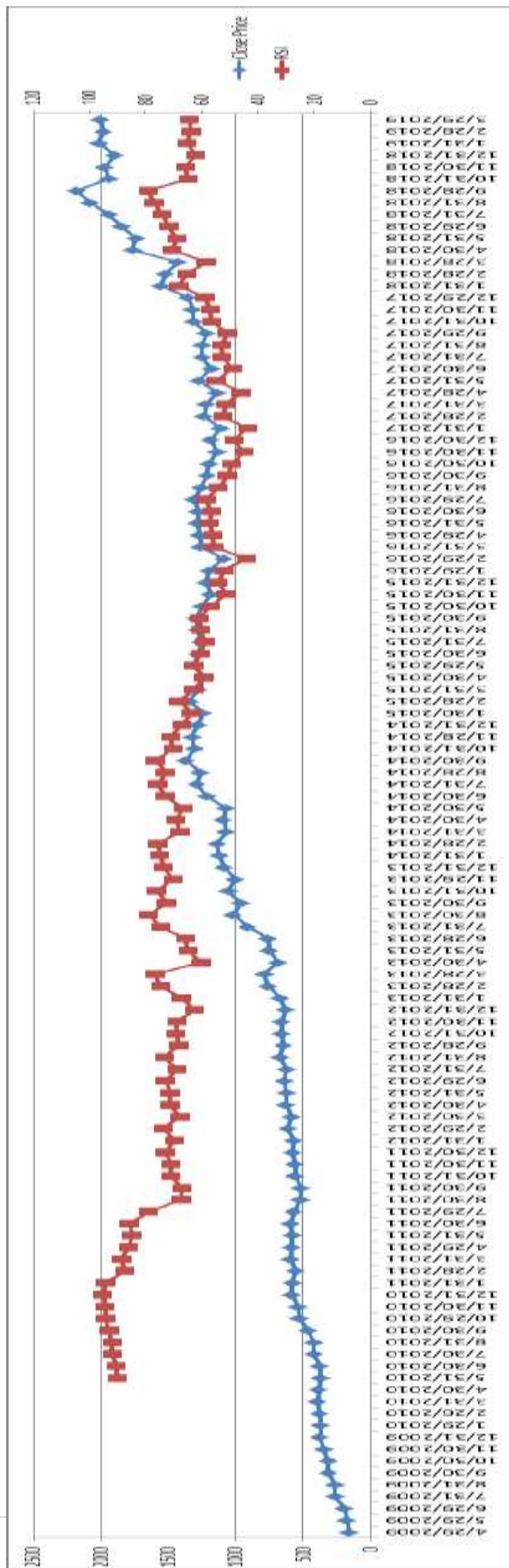
4. During the following interval ROC line rises towards the one mark line after reaching its bottom, which signifies the conversion of selling pressure into buying pressure (Buy Signal):

28.04.17

5. During the flowing intervals ROC line increased from one mark line towards its peak, which signifies the bullish trend in the market for the scrip:

28.04.17 to 28.09.18

Infosys:



Conclusion: (RSI TCS):

A mix movement can be seen in RSI line throughout the duration of study. RSI reaches its peak on 31.12.2010 and a low on 31.01.2017.

Overbought Situation for the Scrip:

*31.01.11 28.03.13 30.08.13
30.09.14 28.09.18*

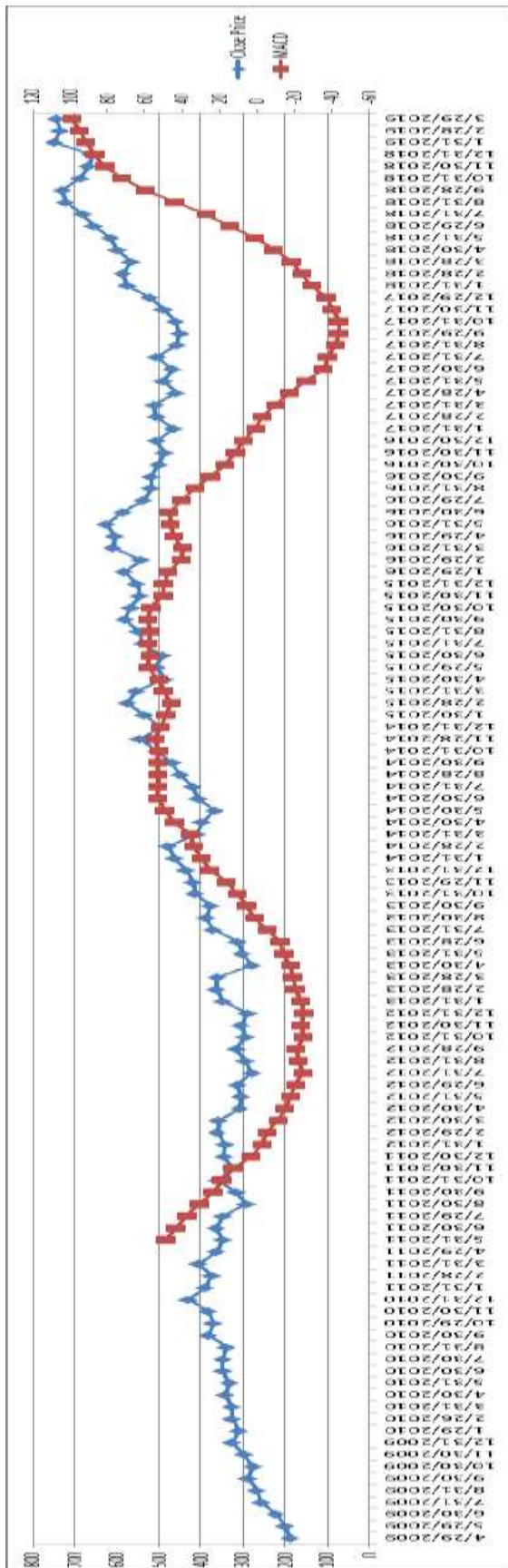
Oversold Situation for the scrip:

From the chart it is very clearly visible that a low of 43.84 on 31.01.17 has been made which is well above the 30 mark line which clearly state that the scrip was never in oversold situation during the 10 year study.

Date	Close Price	MACD	ROC	RSI
4/29/2009	188.655			
5/29/2009	200.64			
6/30/2009	222.065			
7/31/2009	258.045			
8/31/2009	266.395			
9/30/2009	288.3			
10/30/2009	275.775			
11/30/2009	297.42			
12/31/2009	325.14			
1/29/2010	309.4375			
2/26/2010	325.24375			
3/31/2010	326.99375			
4/30/2010	342.26875			
5/31/2010	332.25		1.761151	82.62225
6/30/2010	348.875		1.738811	83.84274
7/30/2010	348.55		1.569585	82.95641
8/31/2010	339.23125		1.314621	77.59499
9/30/2010	381.3125		1.43138	78.2209
10/29/2010	371.4625		1.288458	73.89011
11/30/2010	381.375		1.382921	72.38402
12/31/2010	430.34375		1.446923	81.62872
1/31/2011	389.7125		1.198599	67.52378
2/28/2011	374.6375		1.210705	59.87225
3/31/2011	405.1625		1.24572	68.02646
4/29/2011	363.28125		1.110973	56.52248
5/31/2011	348.20625	48.86716	1.017347	53.47846
6/30/2011	363.80625	43.37485	1.094977	53.52799
7/29/2011	346.9875	37.61589	0.99459	52.3615
8/30/2011	292.86875	31.02913	0.840249	41.98838
9/30/2011	316.63125	23.38571	0.933379	45.72843
10/31/2011	359.69375	18.81656	0.943304	52.51158
11/30/2011	325.85625	12.74553	0.877225	43.05266
12/30/2011	345.95625	3.013958	0.907129	46.88469
1/31/2012	343.25	-2.62061	0.797618	45.26
2/29/2012	360.43125	-5.16182	0.924864	40.56193
3/30/2012	358.2875	-10.9469	0.956358	45.26572
4/30/2012	307.7625	-14.9011	0.759603	40.89734
5/31/2012	303.66875	-17.7155	0.835905	35.11413
6/29/2012	313.65	-20.7944	0.900759	41.96922
7/31/2012	278.36875	-24.4403	0.765157	39.39325
8/31/2012	295.20625	-22.1813	0.850769	39.62021
9/28/2012	316.86875	-20.943	1.081948	45.5086

10/31/2012	295.375	-24.6161	0.932867	50.41403
11/30/2012	304.60625	-23.4367	0.846849	47.91332
12/31/2012	289.8375	-24.9739	0.889464	36.55803
1/31/2013	348.6875	-23.2635	1.007895	54.0075
2/28/2013	363.375	-20.4425	1.058631	53.11668
3/28/2013	361.16875	-19.1046	1.002046	53.21189
4/30/2013	279.43125	-17.8037	0.779908	38.20961
5/31/2013	301.4625	-13.9991	0.97953	42.18121
6/28/2013	312.35625	-12.1483	1.028608	50.70945
7/31/2013	371.20625	-5.29643	1.183505	58.92144
8/30/2013	388.23125	1.516226	1.394665	59.6719
9/30/2013	376.625	5.35601	1.275803	63.57576
10/31/2013	413.7375	10.57075	1.305706	65.50822
11/29/2013	419.31875	16.18061	1.419615	63.99303
12/31/2013	435.70625	25.41278	1.430392	69.43814
1/31/2014	462.6375	29.6478	1.596196	70.86669
2/28/2014	478.10625	34.12604	1.37116	74.81342
3/31/2014	410.35	35.64371	1.129274	57.94057
4/30/2014	397.6	44.06154	1.10087	54.42942
5/30/2014	367.425	49.20697	1.314903	50.75503
6/30/2014	406.94375	53.2746	1.349898	67.13475
7/31/2014	420.95625	52.90938	1.34768	66.41088
8/28/2014	449.85	52.80581	1.21186	67.99333
9/30/2014	468.46875	53.14792	1.206675	64.22642
10/31/2014	506.40625	52.74724	1.34459	66.28877
11/28/2014	544.98125	54.44555	1.317215	71.59971
12/31/2014	493.1375	51.62524	1.176044	59.8158
1/30/2015	535.475	48.81546	1.228982	63.16349
2/28/2015	574.1125	45.88233	1.240955	64.93196
3/31/2015	554.5875	49.98289	1.159967	60.08113
4/30/2015	485.5625	52.61358	1.183289	50.73157
5/29/2015	505.7875	58.58153	1.272101	60.32706
6/30/2015	492.175	57.50168	1.339525	60.21466
7/31/2015	538.525	58.18129	1.32334	67.85593
8/31/2015	547.2	57.26134	1.299898	65.64421
9/30/2015	580.975	58.56883	1.291486	67.09488
10/30/2015	567.725	56.77512	1.211874	63.0281
11/30/2015	543.95	50.25361	1.074138	58.24853
12/31/2015	552.7	49.87244	1.014163	55.40365
1/29/2016	582.45	47.51274	1.181111	54.46555
2/29/2016	542.025	40.7496	1.012232	55.98946
3/31/2016	609.15	39.66138	1.061029	58.50947
4/29/2016	604.05	44.69135	1.089188	53.74816

5/31/2016	624.325	46.33966	1.285777	58.71474
6/30/2016	585.4	46.88534	1.157403	63.4911
7/29/2016	536.925	40.23277	1.090923	53.90917
8/31/2016	517.925	33.52468	0.961747	53.18964
9/30/2016	518.025	24.54543	0.946683	47.13206
10/30/2016	501.05	17.01995	0.86243	43.69018
11/30/2016	487.775	11.59615	0.859175	36.50058
12/30/2016	505.3	7.688702	0.928946	41.06875
1/31/2017	464.3	0.945994	0.840058	39.13962
2/28/2017	506.2	-2.54183	0.869087	44.18532
3/31/2017	511.125	-9.77404	0.942992	40.49063
4/28/2017	459.475	-17.4128	0.754289	39.31392
5/31/2017	488.525	-26.1886	0.808749	32.67753
6/30/2017	467.775	-35.3066	0.749249	31.2719
7/31/2017	505.6	-37.9098	0.863683	34.43461
8/31/2017	457.475	-41.6127	0.852028	33.6235
9/29/2017	449.95	-43.8788	0.868755	37.56167
10/31/2017	460.925	-43.9043	0.889774	41.65691
11/30/2017	488.05	-40.3074	0.974054	45.93421
12/29/2017	521.025	-37.2008	1.068167	52.59669
1/31/2018	575.125	-29.1644	1.138185	60.2656
2/28/2018	586.3	-23.7817	1.262761	59.66356
3/28/2018	565.9	-18.5806	1.117938	62.7478
4/30/2018	599.75	-9.11122	1.173392	61.97977
5/31/2018	615.9	1.24375	1.340443	63.04226
6/29/2018	653.6	14.8234	1.337905	75.03385
7/31/2018	682.55	27.32981	1.459142	75.02741
8/31/2018	720.55	44.05465	1.425138	81.21642
9/28/2018	730.05	59.96843	1.595825	79.80348
10/31/2018	686.4	72.27821	1.525503	80.76329
11/30/2018	667.45	81.48109	1.448066	78.35724
12/31/2018	658.95	86.90176	1.350169	75.98583
1/31/2019	749.55	91.36891	1.438607	79.41507
2/28/2019	734.3	94.89455	1.276766	74.98682
3/29/2019	743.85	98.97179	1.268719	72.07142



Conclusion: (MACD Infosys)

MACD of Infosys made a low on 31.10.2017 and a peak on 29.03.2019. A steady growth pattern has been observed over the past 10 years data.

1. When MACD line is above zero mark having upward trend, it indicates the signal of bullish market for the scrip and the prices will be increasing ahead:

30.08.13 to 30.06.14 31.05.18 to 29.03.19

2. When MACD mark is above zero mark having downward trend, it indicates the signal of bearish market for the scrip and the prices will be decreasing ahead:

30.06.16 to 31.10.17

3. When MACD line is below zero mark line but rising it gives signals of a bullish trend:

31.12.13 31.10.17

4. When MACD line below zero mark line, having downward trend, prices will be decreasing ahead:

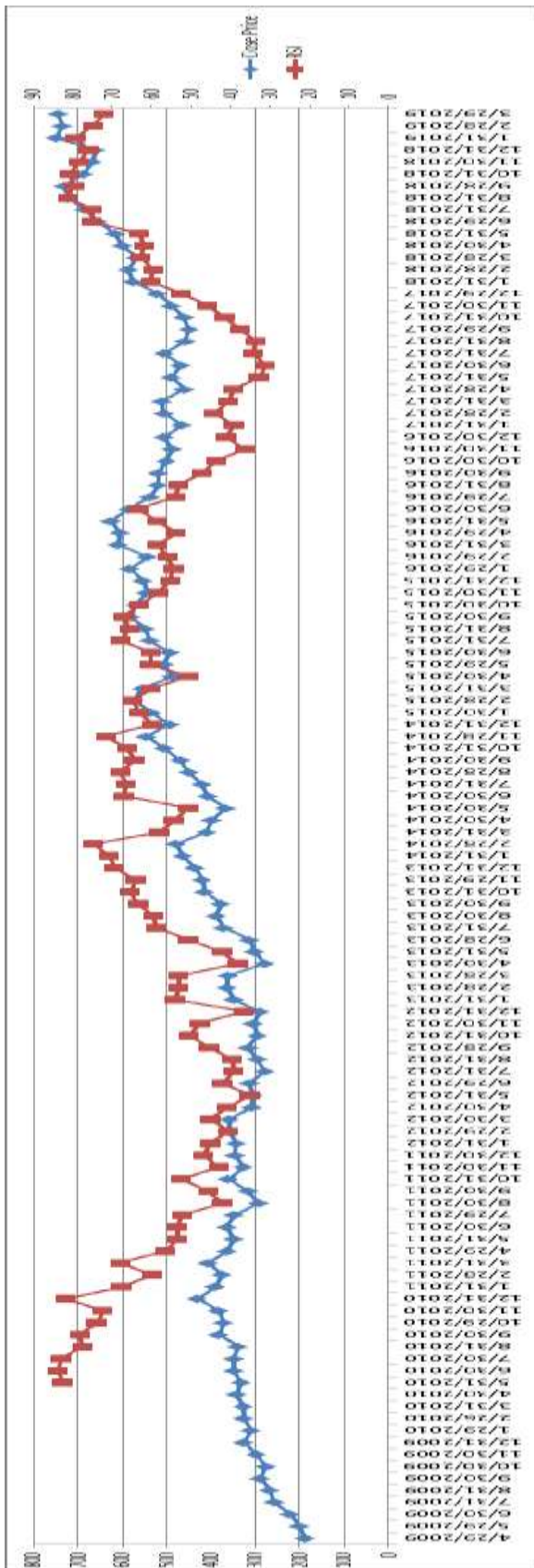
31.01.12 to 31.07.12 28.02.17 to 31.10.17

5. When MACD line forms a peak at the top, it gives signals that the market will soon turn bearish, i.e., it represent overbought situation:

29.03.19

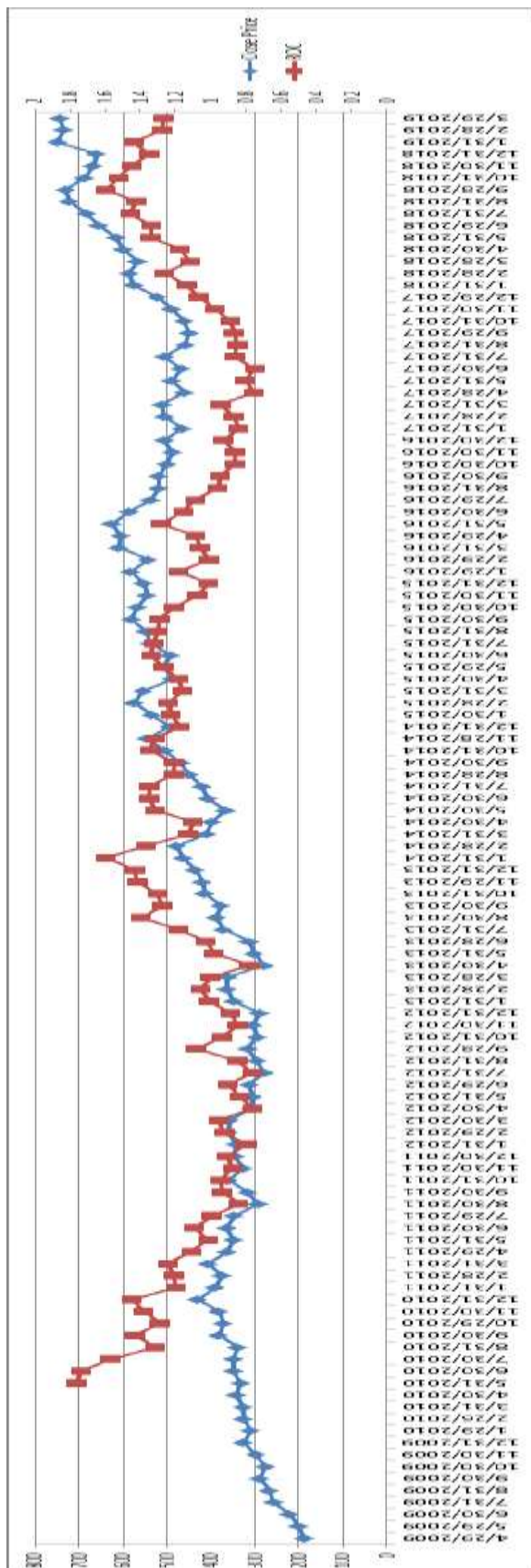
6. When MACD reaches it bottom, it signifies oversold situation, i.e., the market will start becoming bullish:

31.10.17



Conclusion: (ROC Infosys):

1. On the following instances, ROC line touches its peak. Points of overbought market for the scrip, i.e., prices will decline ahead:
31.05.10 28.09.12 31.01.14
2. On the following instances, ROC line touches its bottom. Points of oversold market for the scrip and the prices will be increasing:
31.07.12 30.04.13 28.04.17
3. During the following intervals, ROC line declined from its extreme towards one mark line, which signifies bearish trend in the market for the scrip:
31.05.10 to 29.07.11 31.01.14 to 30.04.14
4. During the following interval, ROC line declined from one mark line towards its bottom, which signifies the selling pressure in the market for the scrip (Sell Signal):
29.07.11 to 31.07.12 31.08.16 to 28.04.17
5. During the following interval ROC line rises towards the one mark line after reaching its bottom, which signifies the conversion of selling pressure into buying pressure (Buy Signal):
31.07.12 to 28.09.12 30.04.13 to 31.01.14
28.04.17 to 28.09.18
6. During the flowing intervals ROC line increased from one mark line towards its peak, which signifies the bullish trend in the market for the scrip:
28.06.13 to 31.01.14 29.12.17 to 28.09.18



Conclusion: (RSI Infosys):

A mix movement can be seen in RSI line throughout the duration of study. RSI reaches its peak on 30.06.2010 and a low on 30.06.2017.

Overbought Situation for the Scrip:

31.12.10 31.12.10 28.02.14
 28.11.14 31.01.19

Oversold Situation for the scrip:

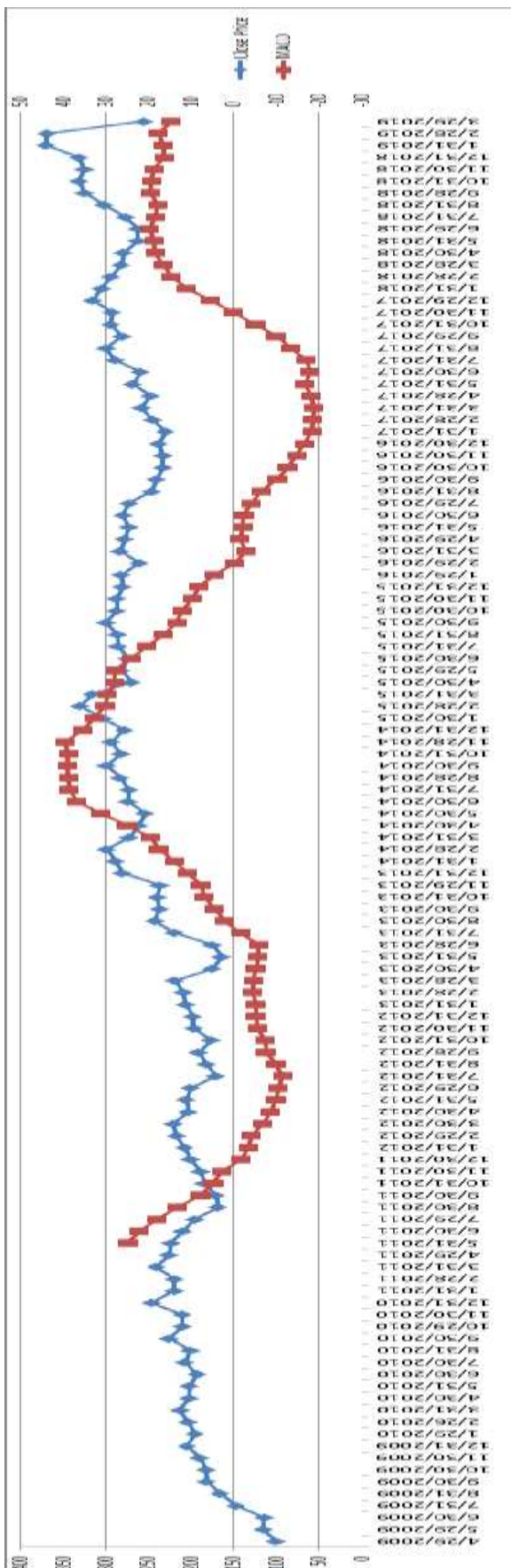
30.06.17 for the level of 31.27 mark from where the stock made an upward rally.

Wipro:

Date	Close Price	MACD	ROC	RSI
4/29/2009	99.255			
5/29/2009	114.675			
6/30/2009	113.385			
7/31/2009	147.045			
8/31/2009	164.985			
9/30/2009	180.63			
10/30/2009	181.77			
11/30/2009	188.715			
12/31/2009	204			
1/29/2010	194.385			
2/26/2010	203.25			
3/31/2010	212.085			
4/30/2010	201.45			
5/31/2010	200.895		2.024029	88.81505
6/30/2010	192.25		1.676477	85.13287
7/30/2010	206.15		1.818142	83.83975
8/31/2010	200.125		1.360978	82.29053
9/30/2010	224.725		1.362094	78.43489
10/29/2010	209.875		1.161906	67.91815
11/30/2010	209.8		1.154206	63.18987
12/31/2010	245.625		1.301566	70.63561
1/31/2011	219.05		1.073775	60.70978
2/28/2011	219.1		1.127145	56.75401
3/31/2011	240.1		1.181304	64.76877
4/29/2011	225.15		1.061603	58.2684
5/31/2011	223.2	24.78782	1.107967	55.48412
6/30/2011	208.8	21.95372	1.039349	54.54288
7/29/2011	194.65	17.91942	1.012484	50.65539
8/30/2011	167.625	13.12494	0.813122	45.84063
9/30/2011	170.4	7.699583	0.851468	42.66991
10/31/2011	183.3	4.780577	0.815664	48.26442
11/30/2011	188.6	2.707372	0.89863	42.88842
12/30/2011	199.35	-1.82503	0.950191	49.68761
1/31/2012	206.95	-3.53471	0.842545	51.76166
2/29/2012	216.175	-4.24673	0.986875	44.22093
3/30/2012	220.05	-6.90468	1.004336	52.28913
4/30/2012	202.525	-8.76221	0.843503	47.04605
5/31/2012	205	-10.0064	0.910504	40.83268
6/29/2012	199.95	-10.6862	0.895833	43.10886
7/31/2012	170.025	-11.551	0.814296	35.66054

8/31/2012	181.3	-9.99022	0.931415	43.6902
9/28/2012	190.525	-7.71218	1.136614	50.96368
10/31/2012	175.325	-7.42292	1.028903	55.0205
11/30/2012	196.625	-5.6734	1.072695	60.59385
12/31/2012	197.25	-5.36282	1.045864	56.90302
1/31/2013	205.775	-5.30593	1.03223	57.68474
2/28/2013	208.2	-4.53109	1.00604	55.11119
3/28/2013	218.575	-4.63574	1.011102	55.80717
4/30/2013	174.175	-5.27035	0.791525	41.24405
5/31/2013	163.825	-5.76795	0.808912	37.57562
6/28/2013	174.5	-5.94071	0.85122	45.08077
7/31/2013	219	-1.69792	1.095274	56.34731
8/30/2013	241.8	2.074519	1.422144	61.0447
9/30/2013	236.525	4.297276	1.304606	67.91998
10/31/2013	238.85	6.851603	1.253641	66.2401
11/29/2013	235.4	7.582853	1.342649	63.67385
12/31/2013	279.6	10.74151	1.421996	74.02046
1/31/2014	287.525	13.7492	1.457668	71.73122
2/28/2014	298.625	17.46635	1.451221	72.64791
3/31/2014	271.6	19.39856	1.304515	65.84242
4/30/2014	261.175	24.91779	1.194899	63.33049
5/30/2014	253.1	31.08622	1.453136	60.03155
6/30/2014	273.2	36.59295	1.667633	75.04389
7/31/2014	272.2	38.44167	1.559885	79.36704
8/28/2014	282.625	38.66394	1.290525	78.77811
9/30/2014	298.4	38.88269	1.234078	73.08012
10/31/2014	281.85	38.59872	1.191629	63.19083
11/28/2014	292.9	39.45288	1.226293	67.16137
12/31/2014	277.6	35.35256	1.179269	62.07401
1/30/2015	303.275	32.56314	1.084675	67.37345
2/28/2015	329.6	30.05401	1.146335	62.86185
3/31/2015	314.425	29.44391	1.052909	57.58413
4/30/2015	269.3	27.77099	0.991532	45.97251
5/29/2015	280.85	27.6883	1.075333	54.0179
6/30/2015	273.35	23.88638	1.080008	54.813
7/31/2015	284.925	20.2891	1.042917	59.29583
8/31/2015	285.9	16.2774	1.050331	55.05205
9/30/2015	298.925	13.24712	1.057674	57.97016
10/30/2015	286.425	11.91202	0.959869	52.76056
11/30/2015	286.65	9.463301	1.01703	49.14634
12/31/2015	279.95	8.078365	0.955787	51.4413
1/29/2016	281.4	4.486218	1.013689	48.91167
2/29/2016	260.125	-0.55433	0.85772	47.22221

3/31/2016	282.125	-3.0383	0.855962	46.59747
4/29/2016	277.175	-1.55705	0.88153	37.49928
5/31/2016	272.725	-2.2774	1.012718	39.47418
6/30/2016	278.975	-2.49327	0.993324	55.18879
7/29/2016	272.525	-4.27372	0.996982	47.73452
8/31/2016	245.825	-6.56042	0.862771	40.93428
9/30/2016	239.475	-10.2559	0.837618	33.57824
10/30/2016	232.2	-12.8353	0.776783	31.13584
11/30/2016	232.625	-14.8075	0.812167	24.68752
12/30/2016	237.225	-16.6516	0.827577	30.35477
1/31/2017	229	-18.5606	0.818003	28.04254
2/28/2017	244.4	-18.5941	0.868515	38.55425
3/31/2017	257.85	-18.8699	0.991254	43.9044
4/28/2017	247.125	-18.2019	0.875942	46.67704
5/31/2017	267.75	-16.8213	0.965996	46.56642
6/30/2017	258.35	-18.1189	0.947291	45.09289
7/31/2017	288.45	-17.0841	1.033964	55.95739
8/31/2017	299.1	-13.6349	1.097514	56.87874
9/29/2017	280.25	-10.0572	1.140039	53.67924
10/31/2017	294.05	-5.21651	1.227894	65.09272
11/30/2017	291.9	-0.00673	1.257106	66.97013
12/29/2017	314.25	5.341827	1.350887	73.6003
1/31/2018	304.7	10.95593	1.284435	70.41272
2/28/2018	292.8	14.49503	1.278603	65.88225
3/28/2018	281.15	16.44631	1.150368	65.4275
4/30/2018	278.75	18.36538	1.081055	61.20285
5/31/2018	261.9	18.65577	1.059788	52.72155
6/29/2018	261.5	19.52115	0.976657	55.98196
7/31/2018	276.4	18.37564	1.069866	54.10616
8/31/2018	301.25	17.69808	1.044375	63.01717
9/28/2018	324	19.3641	1.08325	60.63069
10/31/2018	331.2	19.17628	1.181802	59.69807
11/30/2018	324.65	18.62949	1.104064	64.17033
12/31/2018	330.85	16.21859	1.133436	62.19627
1/31/2019	369.2	16.34071	1.174861	69.57241
2/28/2019	368.9	17.61795	1.210699	65.45791
3/29/2019	254.8	14.42981	0.870219	44.20143



Conclusion: (MACD WIPRO)

MACD of Wipro made a low on 31.03.2017 and a peak on 28.11.2014. A steady growth pattern has been observed over the past 10 years data.

1. When MACD line is above zero mark having upward trend, it indicates the signal of bullish market for the scrip and the prices will be increasing ahead:

30.08.13 to 28.11.14 29.12.17 to 29.06.18

2. When MACD mark is above zero mark having downward trend, it indicates the signal of bearish market for the scrip and the prices will be decreasing ahead:

28.11.14 to 31.03.17

3. When MACD line is below zero mark line but rising it gives signals of a bullish trend:

31.08.12 28.04.17

4. When MACD line below zero mark line, having downward trend, prices will be decreasing ahead:

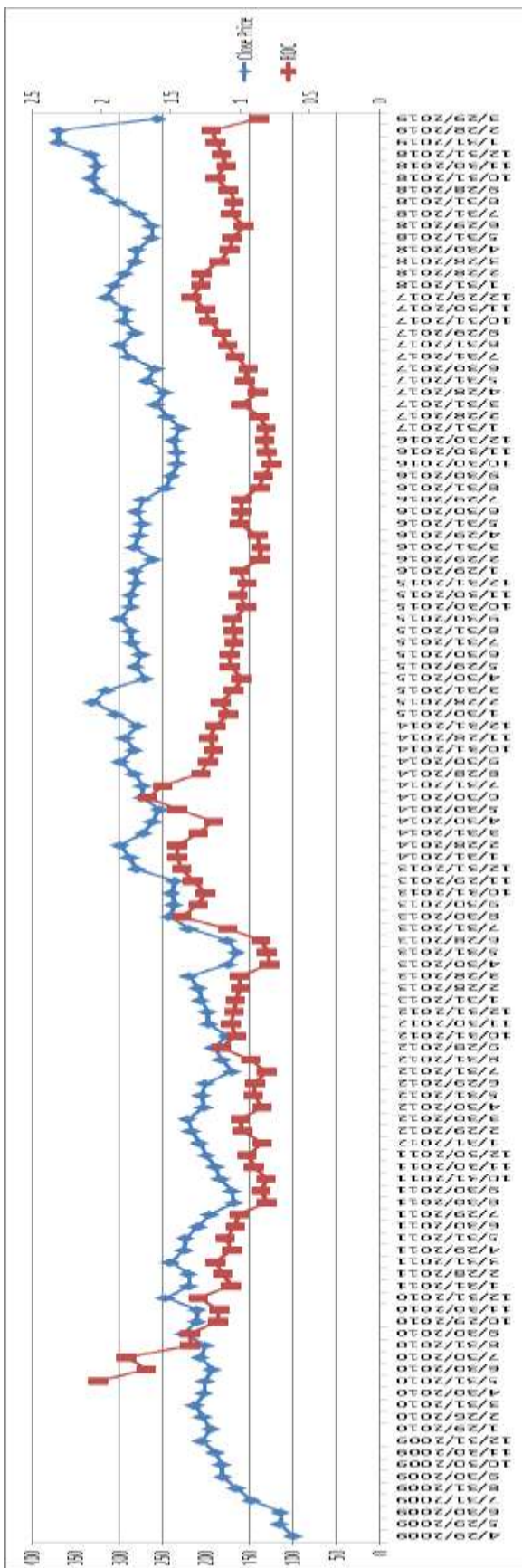
30.12.11 to 31.07.12 29.02.16 to 31.03.17

5. When MACD line forms a peak at the top, it gives signals that the market will soon turn bearish, i.e., it represent overbought situation:

28.11.14

6. When MACD reaches it bottom, it signifies oversold situation, i.e., the market will start becoming bullish:

31.03.17



Conclusion: (ROC WIPRO):

1. On the following instances, ROC line touches its peak. Points of overbought market for the scrip, i.e., prices will decline ahead:

31.05.10 30.06.14

2. On the following instances, ROC line touches its bottom. Points of oversold market for the scrip and the prices will be increasing:

31.07.12 30.04.13 30.10.16

3. During the following intervals, ROC line declined from its extreme towards one mark line, which signifies bearish trend in the market for the scrip:

31.05.10 to 29.07.11 30.06.14 to 31.03.15

4. During the following interval, ROC line declined from one mark line towards its bottom, which signifies the selling pressure in the market for the scrip (Sell Signal):

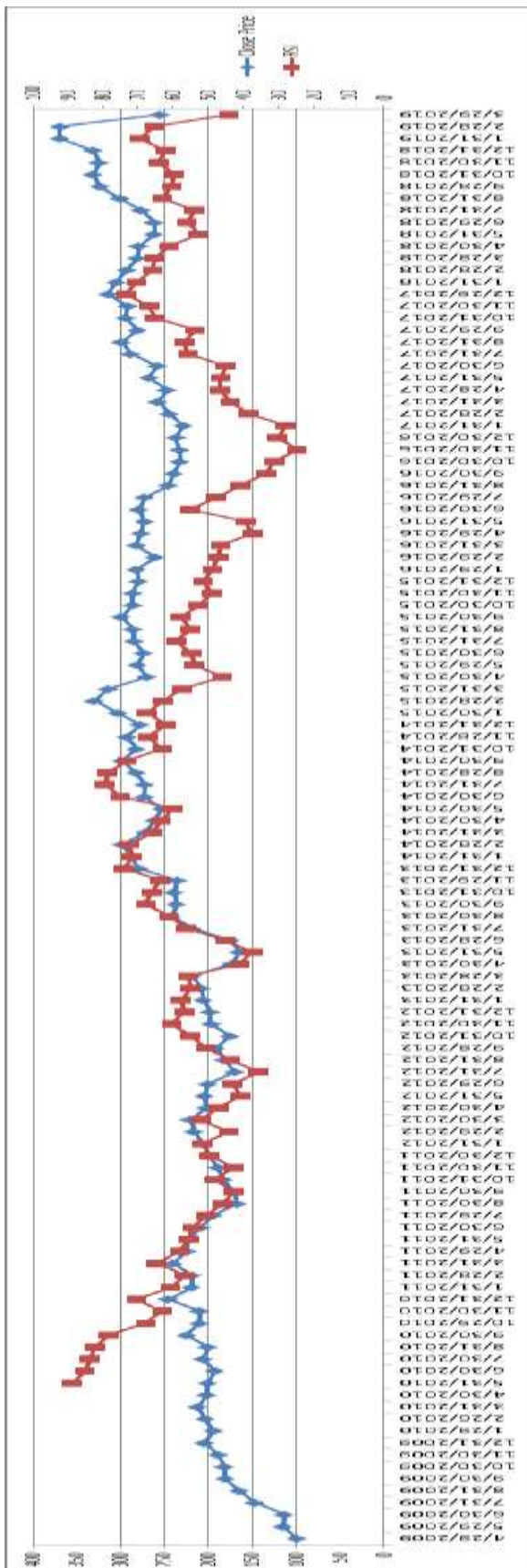
30.06.16 to 30.10.16

5. During the following interval ROC line rises towards the one mark line after reaching its bottom, which signifies the conversion of selling pressure into buying pressure (Buy Signal):

30.10.16 to 31.03.17

6. During the flowing intervals ROC line increased from one mark line towards its peak, which signifies the bullish trend in the market for the scrip:

31.07.13 to 30.06.14 31.07.17 to 29.12.17



Conclusion: (RSI WIPRO):

A mix movement can be seen in RSI line throughout the duration of study. RSI reaches its peak on 31.05.2010 and a low on 30.11.2016.

Overbought Situation for the Scrip:

31.05.10 31.12.13 31.07.14
29.12.17 31.01.19

Oversold Situation for the scrip:

30.11.16 31.01.17

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