Dependence of Share Market performance of local companies of India on performance of companies of Japan and U.S.A.

By:

Ujjawal Panchal1 & Dr. Sanjay Verma2

1. Intern at Indian Institute of Management, Ahmedabad.

2. Professor at Indian Institute of Management, Ahmedabad.

Abstract

The impact of the international factor on companies of any country is a matter of global interest to both governments and MNCs. This can be estimated by taking an example of a total of 200 companies of three countries namely India (Country 1), Japan (Country 2) and United States of America (Country 3) and training computational statistical models on the data made available for these companies predicting dependent variable as companies of Country 1 sequentially on the basis of independent variables as companies of Country 2 and Country 3. Significant accuracy is obtained with little error even when local factor of country 1 is completely ignored and is not a part of the feature set used to train the statistical model.

1.Introduction

“The local stock market prices of companies of a India are dependent to a degree on the performance of companies of other countries i.e. the international factor.” The validity of this claim is tested by experimenting it on the companies of countries India, Japan and United States of America.

2. Data Collection and Pre-processing

For the experiment, share market data from source a is collected for 66 companies of India (names listed in appendix a), 67 companies of Japan (names listed in appendix b) and 67 companies of United States of America (names listed in appendix c).

Data collected from source a contains following indicators such as Open, High, Low, Close and volume for a day.

The average of Open, High, Low and Close (formula shown as follows) is calculated and concatenated into a single dataset.

OHLC Average = (Open + High + Low + Close) / 4

The default setting for many indicators is to use the close of the time frame as the input data.

Changing this to the open, the high or low can dramatically affect how the indicator moves and the analytical insight it provides.

The open, high, low and close average (OHLC average) is the average of all these settings combined (reference 1).

The calculated OHLC Averages for each company is concatenated into a single file alphabetically.

3. Model Formation and Analysis

Using the 80 % of the randomly chosen records of the formed dataset, a polynomial regression model is formed one by one for each of the 66 companies of India using the features as all the companies of Japan and United States of America.

This trained model is tested against the remaining 20% of the dataset. The following errors are calculated for all 66 companies of India for the actual result of the dependent variable of the test set against the calculated prediction:

1. Mean Absolute Error.
2. Mean Squared Error.
3. Root Mean Squared Error.

Now, the average of the (randomly chosen) test set of all these variables is recorded.

Now, for all the columns, we divide the errors by the average of test set (let it be called column alpha\_1, column alpha\_2 and column alpha\_3 for the three errors given above respectively). After this, alpha\_1 and alpha\_2 are multiply by hundred to find the percentage.

Column alpha\_1, alpha\_2 and alpha\_3 are averaged.

The mean of alpha\_1 is obtained as : 6.9888 % (rounded)

The mean of alpha\_2 is obtained as : 74.9005 (rounded)

The mean of alpha\_3 is obtained as : 13.5450 %(rounded)

Now, When mean of alpha\_1 is subtracted from hundred, we get: 93.0112 % (average model accuracy using Mean Absolute Error).

Similarly, when mean of alpha\_2 is subtracted from hundred, we get: 86.4550 % (average model accuracy using Root Mean Squared Error).

Result and Conclusion

The results obtained from the experiment, that is average model accuracy using Mean Absolute Error and Root Mean Squared Error suggest that the statement in question is valid and that there is a very high dependence of share market performance of companies of India on the share market performance of companies of Japan and United States of America.

References

1. https://www.thebalance.com/average-of-the-open-high-low-and-close-1031216

Sources

1. performance.morningstar.com

Appendix a

The 66 companies of India selected for experimentation are arranged alphabetically and listed as in the dataset.

(Company 1 of the dataset corresponds to the First Company alphabetically (lexical indexing).)

1. Adani Enterprises Ltd
2. Allahabad Bank
3. Ambuja Cement
4. Apollo Hospitals Enterprise Ltd
5. Aptech Ltd
6. Arvind Ltd
7. Ashok Leyland Ltd
8. Asian Paints Ltd
9. Axis Bank Ltd
10. Bajaj Auto Ltd
11. Balaji Telefilms Ltd
12. Bharat Electronics Ltd
13. Bharat Heavy Electricals Ltd
14. Britannia Industries Ltd
15. Container Corporation of India Ltd
16. Coromandel International Ltd
17. City Union Bank Ltd
18. Dabur India Ltd
19. Dena Bank
20. Dish TV India Ltd
21. Dr. Reddy's Laboratories Ltd
22. Eicher Motors Ltd
23. Eveready Industries India Ltd
24. Exide Industries Ltd
25. The Federal Bank Ltd
26. Force Motors Ltd
27. Fortis Healthcare Ltd
28. Great Eastern Shipping Co Ltd
29. Godrej Industries Ltd
30. Havells India Ltd
31. HCL Technologies Ltd
32. ICICI Bank Ltd
33. IndusInd Bank Ltd
34. Infosys Ltd
35. Kotak Mahindra Bank Ltd
36. Karnataka Bank Ltd
37. Larsen & Toubro Ltd
38. Mangalore Chemicals & Fertilizers Ltd
39. Maruti Suzuki India Ltd
40. Mastek Ltd
41. Moser Baer India Ltd
42. Mphasis Ltd
43. MRF Ltd
44. National Aluminium Co Ltd
45. Oil & Natural Gas Corp Ltd
46. Pentamedia Graphics Ltd
47. Power Grid Corp Of India Ltd
48. Punjab National Bank
49. Rajesh Exports Ltd
50. Raymond Ltd
51. Reliance Steel & Aluminum Co
52. Sonata Software Ltd
53. The South Indian Bank Ltd
54. Spicejet Ltd
55. State Bank of India
56. Sun Pharmaceuticals Industries Ltd
57. Tata Motors Ltd
58. Tata Steel Ltd
59. TVS Motor Co Ltd
60. UltraTech Cement Ltd
61. Vadilal Industries Ltd
62. Videocon Industries Ltd
63. Welspun India Ltd
64. Wipro Ltd
65. Zandu Realty Ltd
66. Zee Entertainment Enterprises Ltd

Appendix b

1. Advantest Corp.
2. Aichi Bank Ltd
3. Aichi Steel Corp
4. Aisin Seiki Co Ltd
5. Allied Telesis Holdings
6. Alps Electric Co Ltd
7. Aomori Bank Ltd
8. Asahi Group Holdings Ltd
9. ASICS Corp
10. Autobacs Seven Co Ltd
11. Bridgestone Corp
12. Canon Inc
13. Capcom Co Ltd
14. Casio Computer Co Ltd
15. Central Japan Railway Co
16. Chiyoda Corp
17. Chubu Electric Power Co Inc
18. Chugoku Electric Power Co Inc
19. Citizen Watch Co Ltd
20. Daicel Corp
21. Daiichi Sankyo Co Ltd
22. Daikin Industries Ltd
23. Daimaru Enawin Co Ltd
24. Dentsu Inc
25. Descente Ltd
26. Disco Corp
27. East Japan Railway Co
28. Eiken Chemical Co Ltd
29. Fanuc Corp
30. Fast Retailing Co Ltd
31. Fujitsu General Ltd
32. Futaba Corp
33. GS Yuasa Corp
34. Hamamatsu Photonics
35. HAZAMA ANDO Corp
36. Hitachi Ltd
37. Hokkaido Electric Power Co Inc
38. Honda Motor Co Ltd
39. Hosiden Corp
40. Hoya Corp
41. Inpex Corp
42. Isuzu Motors Ltd
43. ITOCHU Corp
44. Juki Corp
45. Kagome Co Ltd
46. Kajima Corp
47. Kawasaki Heavy Industries Ltd
48. Keihin Corp
49. Keio Corp
50. Kikkoman Corp
51. Kintetsu Group Holdings Co Ltd
52. Konica Minolta Inc
53. Kobe Electric Railway Co Ltd
54. Kubota Corp
55. Koei Tecmo Holdings Co Ltd
56. Konami Holdings Corp
57. Kumagai Gumi Co Ltd
58. Kuraray Co Ltd
59. Kurita Water Industries Ltd
60. KYB Corp
61. Mabuchi Motor Co Ltd
62. Maeda Corp
63. Makita Corp
64. Marubeni Corp
65. Mitsui & Co Ltd
66. Nissan Motor Co Ltd

Appendix c

1. 3M Co
2. Abbott Laboratories
3. Amazon.com
4. AmerisourceBergen Corp
5. Apple Inc
6. Bank of America Corporation
7. Berkshire Hathaway Inc
8. Boston Scientific Corp
9. Cardinal Health Inc
10. Caterpillar Inc
11. Cisco Systems Inc
12. Coca-Cola Co
13. Costco Wholesale Corp
14. CVS Health Corp
15. Daimler AG
16. Dentsply Sirona Inc
17. Dominion Energy Inc
18. DowDuPont Inc
19. Duke Energy Corp
20. Exxon Mobil Corp
21. Ford Motor Co
22. Freeport-McMoRan Inc
23. General Dynamics Corp
24. General Electric Co
25. General Mills Inc
26. Honeywell International Inc
27. HP Inc
28. International Business Machines Corp
29. Ingersoll-Rand PLC
30. Intel Corp
31. International Paper Co
32. Intuit Inc
33. Jack Henry & Associates Inc
34. JetBlue Airways Corp
35. Deere & Co
36. Johnson & Johnson
37. Johnson Controls International PLC
38. Kimberly-Clark Corp
39. Eli Lilly and Co
40. Lockheed Martin Corp (LMT)
41. McKesson Corp
42. Merck & Co Inc
43. MGM Resorts International
44. NextEra Energy Inc
45. NiSource Inc
46. Northern Trust Corp
47. Northrop Grumman Corp
48. Oracle Corp
49. PepsiCo Inc
50. Pfizer Inc
51. Principal Financial Group Inc
52. Procter & Gamble Co
53. Raymond James Financial Inc
54. Roche Holding AG ADR
55. SAP SE ADR
56. Schneider Electric SE
57. Scholastic Corp
58. Southern Co
59. Southwest Airlines Co
60. Starbucks Corp
61. Stryker Corp
62. The Kroger Co
63. Tyson Foods Inc Class A
64. UnitedHealth Group Inc
65. United Technologies Corp
66. Verizon Communications Inc
67. Walmart Inc